

Heading towards

redefining the admittance of
international students at AAU

502a - BAIT 5



BAIT 5. Semester

Project group: B502a

Title: Heading towards
redefining the admittance
of international students
at AAU

Theme: Developing IT Systems
in a Business Context

Project period: BAIT5
3rd of September -
21th of December
2010

Project group: B502a

Education: Aalborg University
BAIT

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Pagecount: 129

Submission date: 21/12/2010

Synopsis:

This report describes a development of an IT system, with business processes as the primary focus.

The IT system to be developed aims to support the application process for international students at Aalborg University, in a way that makes this process more efficient.

The report contains 7 main chapters. An introduction to the problem domain, the development process structured in the 5 D's; Define, Discover, Dream, Design and Deliver, and finally a reflection of the work and work process.

The overall learning goal of this project is to understand the business context when developing IT systems.

Preface

This project is done by the project group B502a on the 5th semester BAIT study at the Department of Computer Science, Aalborg University. The project period stretches from the 2nd of September to the 21st of December 2010. The theme of the project is “Developing IT Systems in a Business Context“ and the objective of this report is to demonstrate, that we have an overall understanding of the connections between IT systems, markets and organisations. The subject that we will look into is “The application process for international students at Aalborg University”.

The structure of the report will follow our interpretation of the 5 D’s model, that was introduced during the LUF course (Møller, 2010). “Define” will describe the problem domain. “Discover” will provide an analysis of it. “Dream” then states a list of ideas to solve the problems identified. In “Design”, the requirements of a sufficient solution will be stated, and finally, “Deliver” will describe the implementation of a solution, that meets the requirements. In the last chapter, we will discuss and reflect over the project. Each of the “D” chapters will have a short introduction, stating the content of the chapter, and at the end, an outline will summarize the results of the chapter.

We would like to thank the involved secretaries at the International Office and departments, along with the coordinators, for their cooperation in the preparation of this project. Their assistance has been critical for the completion of the project.

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CHAPTER 1

INTRODUCTION

This chapter is an introduction to, and presentation of, the subjects we are going to work with in this report. The report will deal with the application process of international students at Aalborg University (AAU). It will describe the problem domain that we are going to work with, and analyse it afterwards. From the analysis chapter, a gap between the described reality and the visions of AAU will appear, and we will try to design a realistic setup, supported by an IT system, that might close it. As a part of the way to develop this setup, we will present our suggestions of perfect scenarios. Next we will try to describe the way to implement our setup and the consequences of it on different levels; economically, organizationally etc. Lastly we are going to reflect over the work we have done and our work process.

We have obtained the knowledge demonstrated in this report from courses during this semester and by seeking relevant information online and in books. The two main courses of this semester have been “Management of Business Processes“ (LUF) and “Integrated Product Development“ (IPU). We will also have earlier semesters’ syllabus in mind. One of the things we will use from earlier semesters is usability theory when we create mock-ups. Others are principals and theory regarding software engineering and gathering of data through interviews.

The subjects we work with are going to be described in the next 3 sections.

First a section called ”Presentation”. This section describes Aalborg University, the organisation of Aalborg University, international students, the International Office at Aalborg University, how to become an international student at Aalborg University and how to be one.

The second section focuses on the motivation to work with these subjects, this being both the formal learning goals and scope set by the study board of Department of Com-

puter Science (CS) at Aalborg University and other factors.

In the end of this chapter we will do a delimitation of the subjects we are working with by presenting a problem domain. The problem domain is stated as a question that defines the direction of the project.

1.1 Presentation

1.1.1 Aalborg University

Aalborg University is the regional university of Region Nordjylland in Denmark. In 1974 a number of institutions situated in Aalborg with an academic level suited for an university gathered and formed what today is known as Aalborg University. Aalborg University today offers a wide range of academic educations under the faculties of “humanities”, “social science”, “engineering & science” and from this year “medicine” (AAU, 2010*b*) (AAU, 2010*f*).

What separates Aalborg University from most other universities is the way it deals with learning. This is done by organising teaching and study projects in a problem based way. This gives the students at Aalborg University the opportunity of mastering big parts of their own learning in project groups. Furthermore, Aalborg University focuses on productive relations to the business community, thereby making student projects formed as close to real life business projects as possible. A significant number of project groups actually collaborates with businesses or use the projects on their own ventures. This method of handling teaching, learning and collaboration with others is known not only in Denmark, but also internationally, as “The Aalborg PBL Model” (AAU, 2010*a*). “The Aalborg PBL Model” is a quite unique approach to academic work. The backbone in this model is the result oriented group work with relevant real life problems, which are analysed in a depth that the current academic level allows: The responsibility of the work method, and thereby the success of the projects, is mainly placed at the group. Every group has a supervisor attached who can be consulted for guidance.

1.1.2 Organisation at Aalborg University

Organisation theory has been a subject of research since the early parts of the last century. Pioneers in this field include Max Weber (Bureaucracy) and Frederick Winslow Taylor (Taylorism and Scientific Management). Quite a few different methodologies have been produced and tried in different situations. When considering organisation theory for this project, the main courses are a natural place to start. Specifically, the LUF course is relevant in this case. This course has mainly been about Business Process Management (BPM), which aims at optimizing the underlying processes, for a more profitable outcome. BPM only covers a small part of organisation theory, and has its roots in Scientific Management. This field is considered to have been introduced by Frederick

Winslow Taylor in the last century, where he presented scientific studies of different production companies. This led to the movement now called Taylorism (Britannica, 2010a). When transforming processes within an organisation, for example using BPM, you are most likely to change the organisational structure as well (Jedd, 2007). In the 1980's a radical shift was made in organisation theory, where psychology and sociology studies were introduced as a normative discipline. Leading this transformation were scholars such as: Mintzberg, Simon and Morgan.

We will use Mintzberg's theories on organisational configuration to describe AAU as an organisation. Mintzberg have an entire framework to describe different types of organisation. Other heavyweights in the field of describing organisations like Morgan (Morgan, 2006) does not produce as broad an overview as Mintzberg, from our point of view. According to Mintzberg every organisation could be summarised by one of 7 different structures (Mintzberg, 1980).

Mintzberg's segregation of organisation from 1980 has been subject of critique (Dissanayake and Takahashi, 2006). Mainly his strict view of how organisations, no matter complexity, can be simplified towards a reference model (Dissanayake and Takahashi, 2006). This critique is not just aimed at Mintzberg's theories, but at the entire field of classic organisational theories. The critique being that they are not following time concurrent problematics, much like mentioned by Morgan back in 1980. He stated that organisation theory has become slave to it's own terminology and metaphors (Morgan, 1980). However, others still defend Mintzberg's theories by adding a level of abstraction, making it possible to describe modern organisations (Jacobsen and Thorsvik, 2007). This report will, to some extend, make use of Mintzberg's paradigm and terminology as a tool of abstraction to explain organisations. The following will describe the organisational behavior of AAU and further details of Mintzberg's segregation of organisations.

Figure 1.1 is a general overview of AAU from a managerial point of view. At AAU all schools are self supported and -organised. According to Mintzberg's theories on organisational configuration, this type of structure could be classified as a "divisionalised form" (Mintzberg, 1980). Mintzberg uses the model seen in figure 1.2 to illustrate this form. Basically, you have a professionalised top management, with a relatively large supporting staff. This includes functions such as Human Resources and Public Relations among others. These functions are needed by every division, usually in the same manner. For AAU this would cover just about the entire administration part, which is organised hierarchically. Typically the person or persons in top are responsible for the entire process. The structure of the AAU administrative supporting staff can be seen in figure 1.3.

One of the key reasons for calling AAU a divisional structure, is the goal management parameter. In this structure the different divisions (Schools) are performance measured in a standardised form. This is because each division could be quite different structured, and this is accepted by the top management. In the case of AAU, we see each school

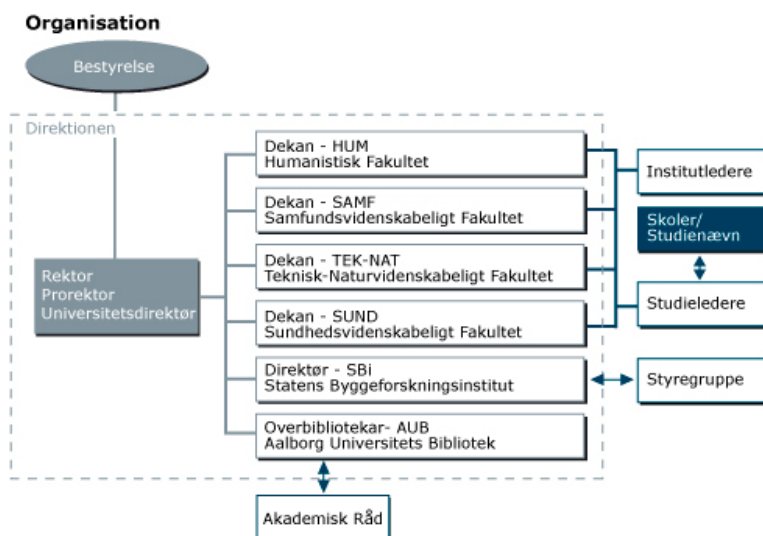


Figure 1.1: Description of the general organisational structure of AAU (AAU, 2010g)

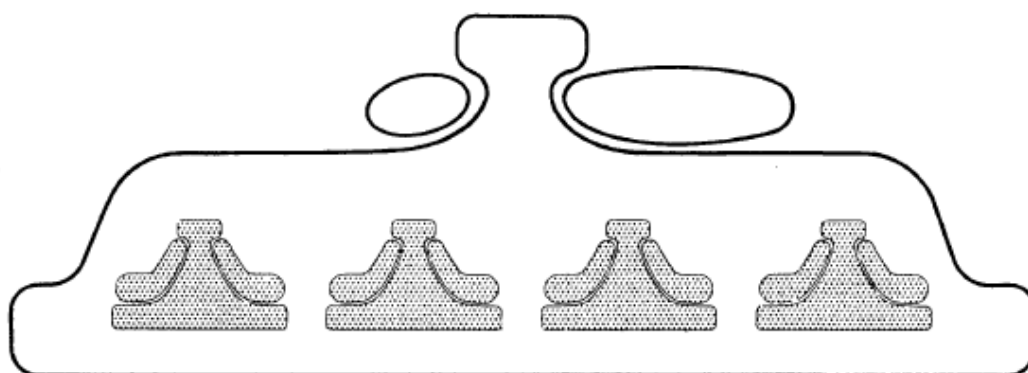


Figure 1.2: Mintzberg's formal description of the divisionalised structure. It is characterised by having a relatively large supporting staff, where each division have a large amount of self governance (Mintzberg, 1980).

being evaluated and rewarded by the sheer number of graduates they produce. But the top management, which includes the board and headmaster, accepts that this is done in a number of ways. For instance one studying to become engineer has a different aim, than one studying humanities. Their educations are significantly different, but the end result is the same; they both earn a masters degree. Being cross-disciplinary students ourselves, we have had some fierce meetings with the different ways of doing things. But this also raises the question, would a standardised approach be more optimal? With an organisation structure like AAU, there is a risk of doing double work and the power balance is moved towards the middle (School leaders) (Mintzberg, 1980). Of course it is not a possibility to make a total bureaucratic structure, as this simply will not fold with the academic world. Implicit the machine bureaucracy relies on the fact that noone

is capable of doing what they are trying to do, an idea presented by Max Weber in his book “Economy and Society” from 1922. They need to be controlled by other organs in the organisation. Much more interesting is it, what Mintzberg characterises as the professional bureaucracy, is also quite like the structure of the schools. Here you allow decentralisation and rely on highly specialised people in the core. People are not hired to do a specific job, but rather to fill out a missing skill. The control of the organisation happens through mutual adjustments. For instance at AAU in the steering committees, all members have equally important votes, from school leaders to student representatives.

A professionalised structure would also be how the AAU administration could be described, even though a bit more bureaucracy enters here. As figure 1.3 makes clear, a top down approach is used, with one person at the top of the hierarchy. However, the administration also relies on secretaries coping with non-standardised schools, as stated by the divisionalised structure. Therefore, a specific job function is rather hard to find at AAU. A great deal of organisation knowledge is needed to fill out any job. All you know is what the goal is: “To aid the students and employees get through their education and research”.

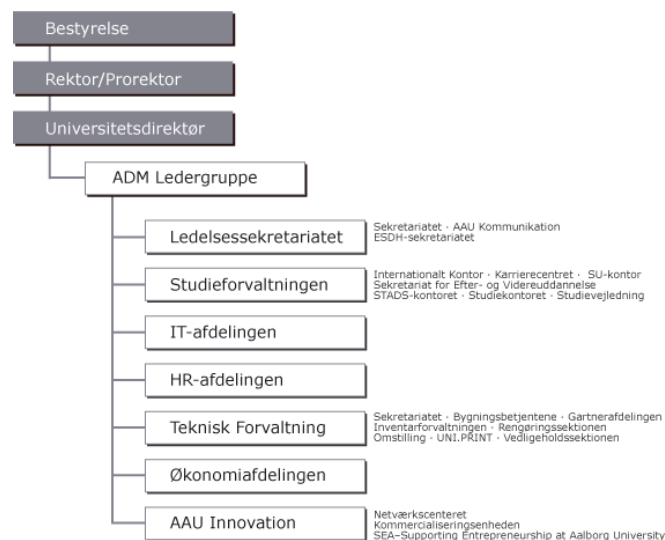


Figure 1.3: *The organisation of the administration at AAU. Here the vision for the administration is clear. “It is the administration’s task to assist the headmaster in managing the administrative services on university level for management, employees, students and external partners” (AAU, 2010h).*

1.1.3 International students

For nearly a millennium there have existed universities in Europe, starting with the founding of the University of Bologna in 1088. Later the idea of academic freedom arose and thereby the idea of traveling between universities in the service of education (Britannica, 2010*b*). To become a student on a university in another country, in our time you cannot just turn up and demand to receive academic challenges in the service of education. You will have to apply, get approved and enroll at any given university. This makes the process seem quite bureaucratic. The European collaboration called the Bologna Process aims to secure mobility, for example through standardisation of grades and tests of subject knowledge measured in ECTS points. This deals with the bureaucracy of validation and approval of study applications. But for now students who wish to study a course, a semester or a degree on a European university, that could be Aalborg University, have to deal with locally determined validation processes and accept to be classified as international students (og Bygningsstyrelsen, 2010).

There are various ways to find a university to study at in another country, if a student wants to change status to be an international student. Exploring the Internet on your own is one way. Using the International Office at one's home university by harvesting their knowledge and experience is another. A third possibility is to use a student organisation that focuses on exchanges and internships. ERASMUS is such an organisation for exchange between European universities (International, 2010*b*). AIESEC is another. Their main focus is internships, however, being a large student driven organisation represented on many universities, they possess knowledge of where to study what. AIESEC could for example be interesting for an American student, who wish to know about European universities (International, 2010*a*).

1.1.4 International students at Aalborg University

In the year 2007, 5013 international students were studying at Danish universities (og Bygningsstyrelsen, 2009). Over 25 percent, more precisely 1591, were studying at Aalborg University (AAU, 2008). Taking into consideration that Danish universities had a total of 126674 students (Statistik, 2008), and Aalborg University only had a total of 11945 (AAU, 2009) students, which correspond to about 10 percent of the total nationwide students, Aalborg University handles quite a few international students compared to their size. Whether it is the "The Aalborg PBL Model" described in an earlier section see section 1.1.1, that Aalborg is known as the northern Paris, the work of the earlier mentioned student organisations, see section 1.1.3, or the descriptions of the courses, semesters or degrees the international students find on their own that leads them to choose Aalborg University, we will leave unstated in this report. The core of the matter is that they apply, get validated, get enrolled, if approved, and study at Aalborg University. When thinking about the proportions, it is natural that the administration of Aalborg University has made space in the organisation for an international office as a part of the student administration (AAU, 2010*h*).

International office

The International Office overall deals with the administrative part of the internationalisation and globalisation pillar in Aalborg University's strategy (AAU, 2010*i*). More specifically, the International Office handles both staff and students who want to exchange. There probably is a lot of exciting circumstances, in the matter of exchanging staff and sending Danish students off to universities around the world. However, it is international students, wishing to study at Aalborg University, that is our concern in this report. It is with that in mind, that we will describe the International Office in this section. 2 members of the permanent staff of 8 are working with international students at full time. They furthermore have the help of a student assistant (AAU, 2010*c*). A big part of their work is the handling of applications and the processes related to that. Another part is to keep the study guide updated, because this is one of the most important tools to attract international students, being the public image (AAU, 2010*j*). Besides that, there are various tasks related to the life cycle of an international student at Aalborg University. Because application handling is a periodic task, the International Office works as a service organ in the period where the students actively studies, for example by helping them find accommodation.

1.2 Motivation

Our studyguide (og Sundhedsvidenskabelige Fakulteter De Ingeniør-, 2009) states that the purpose of this semester is "Developing IT Systems in a Business Context". The overall objective is "That the student achieves a general understanding of the context between an IT system and a marked and furthermore are able to relate it to the organization and arrangement of the development process behind it". To fulfill these objectives a set of learning goals is listed:

- Analyze workflows and business processes.
- Define requirements and specifications.
- Acknowledge a development process.
- Manage a development process regarding requirements and specifications.
- Accomplish feasibility studies of possible solutions.
- Test effect of possible solutions.
- Communicate the effect of possible solutions.

Our semester coordinator Charles Møller has defined a project proposal, that covers both the learning goals just presented, and the subjects presented in this introduction so far (Møller, 2010). He has named the project "AAU International Student Life cycle Management" and stated that focus in this project should lie within mapping the processes,

and developing a context aware IT system to support them. Furthermore, the feasibility of the system should be evaluated. Charles places himself in the position of product owner. Hopefully, since this is a hypothetical project, any misunderstandings regarding the actual stakeholders can be avoided this way.

As far as our own motivation towards this project is concerned, we find Charles' project proposal exciting, because we can relate to it. We have firsthand experience with administration of students, being so ourselves. Through our time as students at Aalborg University, we have all had different hurdles regarding the administration. This stretches from wondering why we have to register to semesters by handing in a paper to a secretary, and afterwards do about the same thing online, to one of us simply getting lost as "active student", due to a change of education. These few examples, and those in between, have often led to discussions in the group room, of how the administration and the supporting IT systems could make the processes more smoothly, both for students and for the people in the different parts of the administration. If casually asked why we, from our point of view, for example have to do things twice, or why the paperwork has a certain amount, the consulted person will often refer to orders or rules from above. Lastly, as we see it, the responsibility cannot pass beyond Aalborg University's visions and strategies (AAU, 2010*i*). We find motivation in investigating how these relate to reality, and we are sure that this can create a standpoint, when we are going to define the IT system, that should be created to support our optimised processes. The more interesting visions, regarding this project, are listed here:

- *Visions for AAU in general*
"This distribution of work between administrative units at AAU is based on the practical principle that administration jobs should be carried out as closely as possible to the managers and environments serviced by the administrative unit in question."
- *Strategic goals for research during the period 2010-2015*
"AAU will [...] ensure free research and internationally strong research environments within all academic fields of the university."
- *Vision for internationalisation and globalisation*
"At AAU, one in ten students [...] are foreigners."
- *Vision for internationalisation and globalisation*
"AAU will create a good framework for international research and educational environments..."
- *Vision for internationalisation and globalisation*
"One future strategic step will be to extend the level of successful internationalisation by actual globalisation."
- *Visions for work and study environments*
"Equal rights as a framework condition and value generating balance between [...]"

nationalities [...] at the university should create equal opportunities for anyone with talent, cooperation skills and energy.”

With this in mind, we are concerned on behalf of the international students, who want to study at Aalborg University, regarding the bureaucracy they could meet. We want to explore the range of the bureaucracy, we presume exists here, based on our own experience. This concern motivates us. We are not alone with this concern. In a chronic in the Danish paper “Information” called “Red universitetet”, which directly can be translated to “Save the university”, the two professors Ole G. Mouritsen and Jesper Wengel (Mouritsen and Wengel, 2010) reveal their concern, that bureaucracy can be deadly to the teaching, researching, conveying and innovative university as we know it. The main points for us in this chronic are:

- Scientific staff is forced to use new IT systems with bad functionality, even though they have self-developed systems that function.
- So-called rationalisations provide locally savings, however, they often lead to global loss.
- There will probably be professional administrators, experts in ‘new public management’, political ideologies, members of the Danish jurist and economist union and other talented people saying that we have not understood the necessity of the rules and systems.

These are main points because they give us motivation. We want to develop an IT system, that the staff actually wants to work with, will be positive about and takes responsibility for. Therefore, the first point is very important for us to keep in mind, also when considering the requirements of the system. The second is important, because a global loss in this matter must not mean that fewer international students apply to Aalborg University, as a direct consequence of easy made optimisations of local processes. The third point is interesting, because we must make sure that the work we do, and the systems we pretend to implement, must be widely understood by all those who interacts with it.

Considering the organisation theory presented in section 1.1.2, we also find motivation in the following issues:

- Will a standardised approach be more optimal?
- Does the current structure induce double work?

1.3 Problem domain

Based on this introduction so far, we will now introduce the problem domain of this report. The following statement defines it:

”How does the admission process of international students occur, are there any problems regarding this process, and if so, how can an IT-system be designed and implemented in order to overcome these problems?”

We allow ourself to narrow down, from the broad ”AAU International Student Lifecycle Management” idea presented by Charles Møller (the semester coordinator), to focus on the admission process. We do this due to several factors; it will be sufficient to cover the learning goals presented in the studyguide. Furthermore, it seems like the process part, and the workload of this field, would fit a group of our size well.

CHAPTER 2

DEFINE

2.1 Introduction

The overall goal with this chapter is to describe the context of the problem domain, and the processes taking place here. It will describe the main purpose of the gathering of data is, and the design of the method. In the light of this, it will describe the results. Here it will describe the stakeholders, the system and workflows, that shows how the processes at each part of the organization take place.

2.2 Defining the problem domain

Before we can find out exactly what to search for it is important to look upon what we know, and what we do not know about the problem domain. This method we learned in the IPU course at this semester (Kyvsgaard, 2010). The things we know something about is how to design and implement an IT-system. This we learned at some of our previous semesters. But before we can do such a thing we need to find out what we are designing it for, what functions it should have, and more importantly, is it needed? Therefore the initial task must be to go out and find some information regarding the admission process.

The initial question must be, can we find any problems regarding the admission process?

What we know:

- There is some sort of admission process regarding the international students.
- We know at least two stakeholders, the international office and the international students.

What we do not know:

- Though we know that there is an admission process, we do not know what subprocesses are taking place in here.
- We do not know the role of the stakeholders, or if there are any more of them than the initial two.
- Are there any problems in the process?

From a starting point of perspective not much is known about the problem domain, therefore data needs to be gathered, in order to get as much information as possible. Questions arise, who exactly is involved in the process, what is involved in the process and are there any problems regarding this and does the overall process match AAU's visions? The gathering of data should explore the problem domain, broadening our knowledge about this so an analysis can be conducted, as to if there are any problems and where they may lie.

2.3 Method

Before designing a way to get data, according to Kvale there must be a purpose. Do we want to explore something or do we want to prove something? (Kvale, 1997) The previous section stated that we wanted to compare the way the processes are at the current moment and how AAU sees them. Since the knowledge about the problem domain is some how limited, the main purpose of the data collection must be explorative.

2.3.1 Design

Since we did not know much about the problem domain, one could ask if a quantitative collection of data, such as questionnaire or a internet survey, might be an idea. Since we did not have a lot of questions, that could be answered in short, we did not find use of a quantitative method at this time. Therefore we decided that the way to gather data would be by qualitative interviews. The possibility to sit down with some persons and let them tell us what they knew, was exactly what we were looking for.

When you design an interview there are certain aspects one must consider, this includes available resources, what type of interview you want to conduct and how many persons should be involved. The following subsections will describe the structure of our interviews.

Interview type

There are a many different interviews types. Each with its own separate approach. The different interviews vary according to what the purpose is. The exploratory interview is open and only a little structured. The interviewer will introduce a question or a field

that needs to be clarified. The interviewer follows the answers and thereby searches for new information regarding the problem domain (Kvale, 1997).

As mentioned before, the type of interview should be explorative. In our case the idea was to sit down with the stakeholder, asking the question "what do you do and who else is involved?". The interview plan was therefore unstructured, with an open dialogue. The advantage of this type of interview is that you can easily make corrections along the way. Of course we knew that we will learn some things about the problem domain as the interviews were conducted, therefore we chose a method where we will adapted our questions along the way.

Available resources

A consideration is the time aspect. The problem with an open and exploratory interview is that you may stumble upon new factors, that may prevent you from finishing your interview at a fixed time. That is, you could be forced to design new interviews or to conduct many more because your problem domain widens, and there are much more data to be collected (Kvale, 1997).

In our case, we did not know enough about the problem domain to determine how many interviews that was needed. Our range of stakeholders could for example widen, forcing us into a position where we needed to conduct more interviews. Since our project is to be handed in at an exact date, the interviews of course had to stop at a certain point, this was mainly because of the need to analyse the data gathered. The deadline of the interviews was set to the 28. th of October so we had enough time to finish our report.

How many interview persons are needed?

The question of how many interview persons is needed, can be answered quite easy. Interview as many as it takes to find the information you need (Kvale, 1997). The necessary amount of interview persons depends on the purpose of the interview. If the purpose is qualitative and you need to understand the context of a situation, it would be enough with one or a few persons.

The amount of persons we needed was unclear. Though we did not know that, it was clear, that we would need enough to make some sort of comparison between different types of stakeholders involved. The idea is to compare two parts of the organisation, that handled the same sort of information, so problems can be pinpointed.

2.3.2 Data processing

Now that we have specified how we want to gather our data, we also want to define what to do with them. We thought that a transcription of the interviews would be the most optimal. This way a structuring of the material would be possible, and it would create a general overview. The amount of transcription depends upon factors as time, money and the character of the data, that is, a recording with a lot of noise can take a long time to transcribe (Kvale, 1997).

Different factors was considered regarding data processing. This includes the amount of interviews, interview time and time limits. Considering these factors a full transcription will not be made. Instead we will extract considerable phrases.

As mentioned earlier, we also want to illustrate processes. The LUF course at this semester introduced us to some important concepts regarding this. This course stressed the importance of organising and managing the organisation processes in order to reach goals. It is necessary to decouple processes from the underlying business with a given set of tools. Later these processes can be implemented in supporting technology, making a link between these two (Snabe et al., 2009). In the course BPMN(Business Process Management Notation) was introduced. BPMN is flow-chart based notation for defining business processes. The basic purpose of the BPMN is to capture an ordered sequence of business activities, it is these sequences that describes how a business pursues its objectives(visions). There are different types of flow-charts that vary in detail. The main purpose for this chapter is to describe the overall processes, so that it can be analysed, but we will not go into detail as to how these flow- charts can be executed by a system, such as SAP (White, 2006). BPMN will be used for the process descriptions.

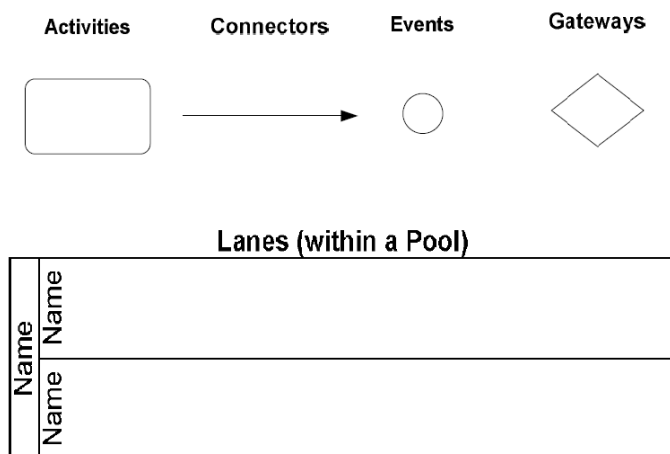


Figure 2.1: The picture shows different elements of BPMN.

There are different elements in a flow-chart, these can be seen in figure 2.1 and are explained in the following.:

- Swim lanes: If there are more stakeholders in a process, this can be illustrated using swim lanes. A swim lane often represent organisation role. Sequence flows(connectors) can cross swim lanes
- Activities: are rounded rectangles. An activity describes work that is performed within a business process.
- Events: are circles. This is something that “happens“ during the course of a process. The events effect the flow of the process, and usually have a trigger or a result. There are three types of events. Start events indicates where a process will begin. End events indicates where a process will end. Intermediate events occurs between a start event and an end event. It indicates where the process waits for a response to the previous activity.
- Gateways: gateways are diamonds. It is elements that is used to control how a sequence flow interact within a process. A gateway is a location within the process, where the flow can take two or more alternative paths. Only one of the paths can be taken.
- Connectors: Are used to show the order in which the activities will be preformed.
- Artefacts: Artefacts provides the capability to show information beyond the basic flow-chart structure of the process. They can be used to define inputs and outputs of activities. In the diagrams they are shown as text besides the connectors.

2.4 Data

The rest of this chapter will address the found data. The data was extracted from the conducted interviews. The interviews that this chapter is based upon can be found on the website described in appendix E.

2.4.1 Stakeholders and workflows

The following section will describe the found stakeholders, and their role in the process. The processes of the stakeholders are described and shown in different work-flow diagrams. Complete diagrams can be found in appendix B. To identify where to start looking for stakeholders, we turn to our organisation description. Seeing that both the international office and different departments all fit the description of a professionalised organisation.

As expected, the interviews showed that the set of stakeholders was larger than originally anticipated. The following only describes stakeholders that is in the process of the admission process at AAU. In order to define the stakeholders we have conducted interviews with:

- 3 international students

- The International Office

- 3 department secretaries
 - Department of Computer Science(CS)
 - Center for Industrial Production(CIP)
 - Department of Energy Technology(ET)

- 2 coordinators
 - Department of Computer Science
 - Center for Industrial Production

- 1 head of board of studies

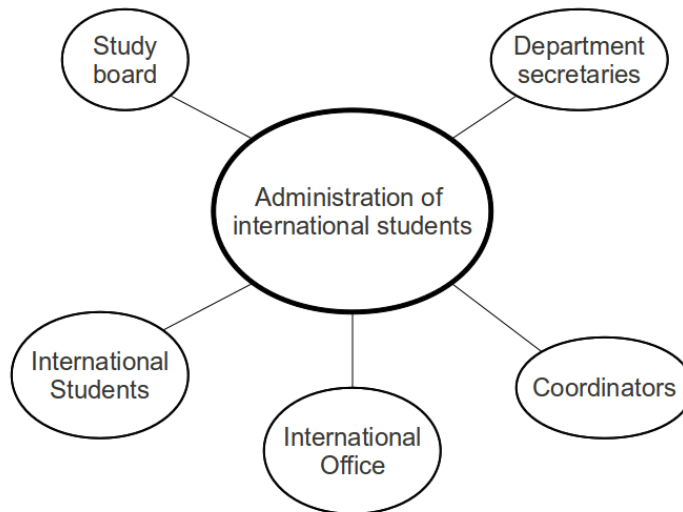


Figure 2.2: *Illustration of the identified stakeholders.*

International students

International students are basically any student that comes from outside of Denmark. There are different kinds of students. (AAU, 2010k)

- Guest students

Guest students are students from other universities with no cooperation agreement with AAU.

- Exchange students

Exchange students are students that are eligible for admission to AAU if their university has a bilateral exchange agreement with AAU.

- Erasmus

Erasmus Students are students eligible for admission to Aalborg University if their home university has an exchange agreement with Aalborg University within the limits of the Socrates/Erasmus programme.

- Degree

Degree Students are students wishing to pursue a degree at Aalborg University.

If the student comes from outside of the EU, they are required an application fee before the application is processed. The fee will be returned if the student is admitted.(AAU, 2010e)

Before the international students can be admitted at AAU they need to fill out an online application form, that they send electronically via the Internet. When this form is filled, they must also send a hardcopy containing info regarding exams and qualifications. These informations must be in paperform, so there can be no document fraud. All of the information is send to the International Office at AAU. The students do not have a major role in the process, as seen on figure 2.3.

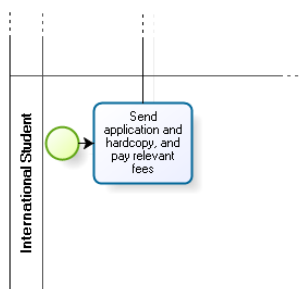


Figure 2.3: *Process workflow showing the only part that involves the international student.*

The International Office

The International Office is an administrative organ at AAU, that specifically handles international students. The purpose of the International Office is to handle the numerous tasks related to implementation of the service provided in connection with international cooperation at Aalborg University (AAU, 2010c).

The International Office is placed under the Study Administration Department see figure 1.3. Furthermore the organisation diagram for the study administration is to be found here see figure 2.4.

This is a classic hierarchy structure, where one person is placed above others. In this case Kirsten Jakobsen is the leader of the International Office and Preben Sørensen is the head of the entire study administration. However as much in common with a classical structure they may have, it is not a machine bureaucracy. It is a much more professionalised structure, where no specific protocol or procedure has to be maintained by the individual employee. One of the good things about this type of organisation is that a great deal of trust is given in the employee's capabilities. This way they can ensure good response time, as they do not have to get committees or such to validate their work. But the list of downsides are equally long. When decision power is given to the employees, they tend to work with those functions that they are actually qualified to handle, even though other tasks may also be in their work field. A professionalised structure do also have quite

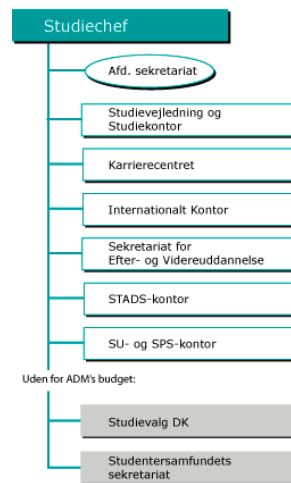


Figure 2.4: (AAU, 2010h)

a few problems with handling cost efficiency. This is due to the concept of trusting in your employees job capabilities, implicit saying, that you trust your employees to control the organisations money (Jacobsen and Thorsvik, 2007). For example, a secretary could prioritise a student coming from an exchange program instead of a foreign student paying a 100.000 DKR. tuition fee. In a narrow point of view, this action does not make any sense, the secretary does in fact say that a student paying no money at all is better than one paying 100.000 DKR. But the secretary knows that for the main organisation, it is better to prioritise exchange programs even though they do not immediately deliver any actual payment.

The International Office must wait for the hardcopy to arrive from the students before they can process the application. When the documentation has arrived, they check that their language skills meets the requirements. This is done before they send it to the department for evaluation. This process is a little tricky, since all students are not treated equally. Generally Erasmus students have an advantage when it comes to the language skills. Sometimes the International Office can estimate that their language skills are sufficient event though they do not meet the requirements, and leave it up to the coordinators to evaluate it. Other students are by default rejected. When the documentation(hardcopy) has been treated, it is send to the department in question to be validated.

When the International Office gets the answer from the department, they send out an answer to the student. If the student is approved, an arrival and acceptance form is also send out, per regular maill. If approved the student is allready admitted at AAU. If they are admitted at another university of choice, they can choose not to come and AAU will first know later. The arrival and acceptance form does not need to be filled to accept the study offer, but they need to send it, along with a picture, if they want a study card the first day. The process can be seen in picture 2.5.

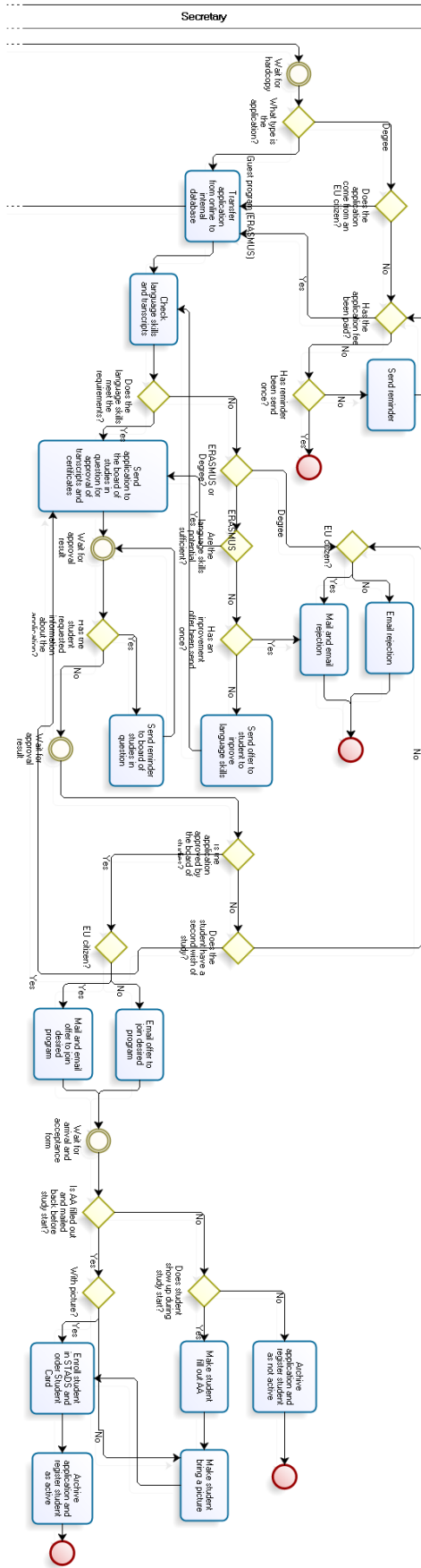


Figure 2.5: Workflow diagram showing the existing process at the International Office.

Departments

Department secretaries

The department secretaries are part of the administration of each department. The secretaries does not evaluate hardcopies, merely sees that the documents gets to the right coordinator. It is the coordinator that handles validation. There are no standardised way of doing this and the International Office is simply interested in a yes(maybe with limitations) or a no. How they reach this conclusion, is up to the departments themselves. Therefore this is not done in the same way all over AAU. The workflows shows the difference in the processes. These can be seen in figure 2.7.

Coordinators

The coordinators are the ones that validate the students paperwork. Each coordinator is relevant for a given education. Usually there is one coordinator per education. When a coordinator receives the paperwork from the secretary, it gets validated, according to study relevancy and language skills. The coordinator at CIP only holds contact with the secretary whereas the coordinator at CS can request information from both students and secretaries. After evaluation the coordinator sends the paperwork and answer back to secretary. The workflows for the coordinators can be seen in figure 2.8.

Board of studies

The board of studies is involved in the admission process at CIP. CIP is currently the only department that uses the study board as a second evaluator of the hardcopy. At CIP, the board of studies has the final word in the admission process. The head of the board of studies has to approve a coordinator's approval. In the case of a denial he has the privilege to consider if there are any other educations in which the student could be admitted. He can then send it to the coordinator of that education. A workflow of the process can be seen in figure 2.6.

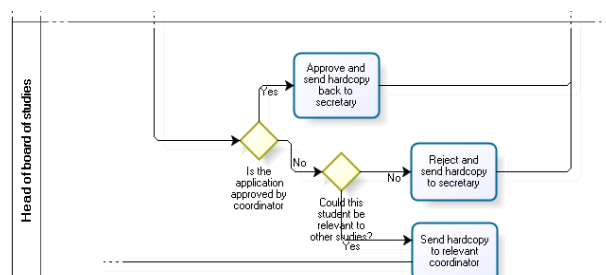


Figure 2.6: *Process workflow regarding the board of studies at CIP.*

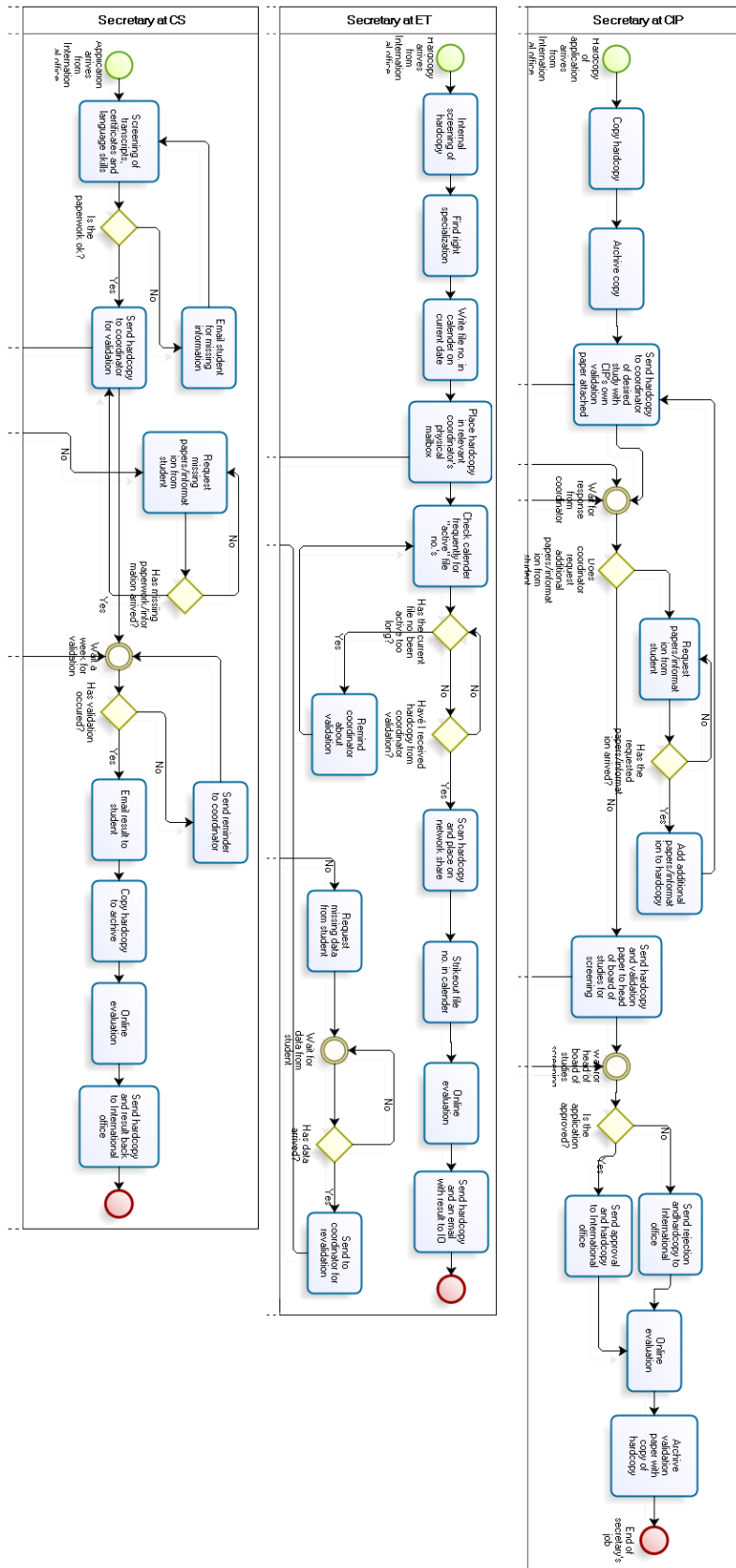


Figure 2.7: Existing workflows at department secretaries.

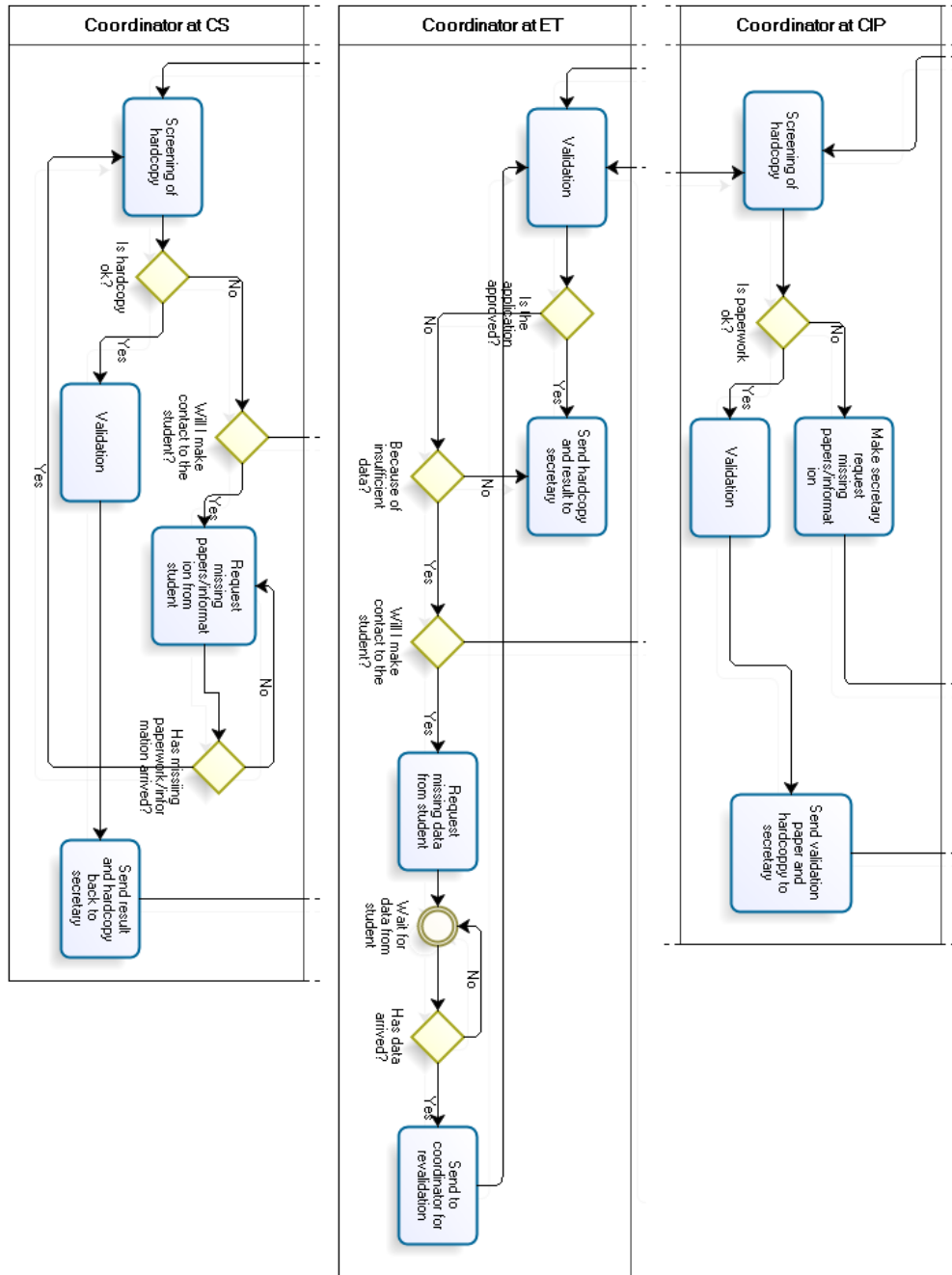


Figure 2.8: Process workflows at different department coordinators.

2.4.2 Current IT support of processes

The workflows defined by far are already in some level supported by IT. We will describe the existing system in this section.

The existing underlying system as it is, consist of a database management system with 3 databases and different web interfaces attached to it.

The first database both an international student and a secretary at the International Office meet in the process consists of three things. The database which contain the application data, an online interface were the international students post their application and an administration web interface for the secretaries to extract the data. The core functionality of this part of the system is to contain the part of an application that an international student files online, and provide the opportunity for the secretaries of extracting it.

The second database contain the data that an international student has posted online to the first database. Here the application data can be extended with information regarding the application process. In short, its purpose is to contain all the digital information regarding the application process. This system can automatically form letters as emails or to send by regular mail with the result of the application. It is in this database that the secretaries at the departments files an online evaluation in the end of the process. It is possible to make an extract of the relevant data from this database that the central student administration system(STADS) can use. That is very useful when an international student is to be enrolled at the university. All interfaces to this database are web based. This is the administration interface that the International Office uses, and the interface to the online evaluation used by the department secretaries.

The two databases just described is the main IT support of the application process. All applications will meet these databases.

There is a third database. It is a database to handle a buddy system. Since this is outside what we work with, we will not describe this database further. From now on we do not consider it at part of the existing system.

The technologies used to develop the web interfaces is XHTML as mark-up language, ASP.NET as scripting language, which for example is used to interact with the database and the database itself, that is the relational database system MSSQL. These are well-known and well documented technologies. See figure 2.9 for an illustrative overview. At the departments it is a blurry picture regarding IT support of the processes. To mention a system from a department we have interviewed, and thereby know are using IT is the Department of Energy Technology. They digitalize the application by scanning it and place it on a network share, which the staff involved in the process can mount and browse.

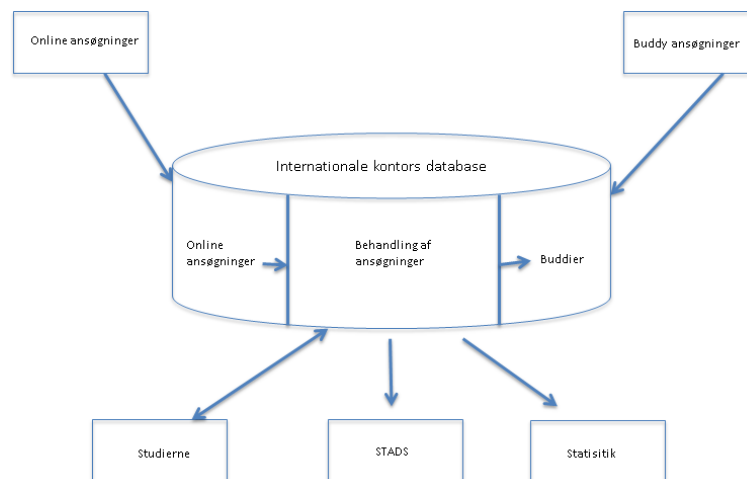


Figure 2.9: *Illustration of the identified system, as stated by the current IT supporter, see appendix D.*

2.5 Outline

The goal for this chapter was to describe the context of the problem domain and the processes taking place here. Data gathering showed us that the application process also involved individual departments of the university. In these departments the application as a minimum, depending on the department, has to go through a secretary and a coordinator and then back to the International Office. Furthermore the data gathering revealed that a system is present, but is not utilised fully. The gathered data was illustrated in BPMN models from which the process can be described.

3.1 Introduction

The overall goal with this chapter is to analyse the context of the problem domain. This includes analysing the stakeholders and finding problems regarding the identified processes. In the end this should lead us to a series of paradoxes that enlightens a gap between the analysed world and the visions of AAU. This will help delimit our solution and make it fit a concrete problem statement.

3.2 Stakeholder analysis

The previous chapter identified the following stakeholders, international students, International Office, department secretaries, coordinators and a board of studies. Each stakeholder is listed in table 3.1. The analysis involves, what is their role and place in the organization, what influence do they have on the overall process, do they have any unique facts and do they know of any problems and if so, do they have any ideas for solving these?

Name	Place in organisation	Role	Influence on process	Unique facts	Aware of any problems	How do they see a solution to the problems
International Students	Not exactly a part of the AAU organisation. Play a role in the process, but not considered vital for the organization build up. Kick starter for the process.	Play a role as applicants.	Role in the application process is inconsiderable. Start the process. Only have contact during the process contact if something is wrong. Not aware of the details of the process.	Starts the process by sending application. Not a part of the organisation.	Not aware of any major problems. Notice the arrival and acceptance form had to be sent more than once. Find it difficult to find pre-study start information on department websites.	No problems during process, so no solutions.
International Office	First arrival place of applications. Administrative part of AAU. Forwards the applications to institutes. Can perform language skill evaluations before forwarding.	Primarily an administrative role.	Minimal influence on the process. Can end the process by denying an application.	Administrative part of the organisation.	Comment on use of paper applications and snail mail to institutes. Simple task, but depends on certain factors - secondary processing time and not getting lost in the mail.	Already have a lot of information on digital form, an idea could be to digitalize the rest of the documents.
Coordinators	Usually the last place the application needs to be shipped to before it is approved or declined.	Play the role as the final answer to whether or not a student is admitted.	Has the ability to influence the process due to validation.	Validator.	Two problems: Potential accumulation of applications before the validation process is done, because of time efficiency compared to individual handling. Similar cases can result in the same work being done twice.	No solution to the first problem. Suggests a history about validated papers.
Department Secretaries	Redistribute applications to coordinators. An administrative part of the organisation. No influence on whether the process can stop.	An administrative role. Keep track of applications when they arrive at the department.	Can slow down the process but not stop it.	Link between international office and coordinators. Administrative.	Have experienced problems with the paperwork.	A digital solution, where papers are digitalized.
Board of studies	Not a defined part of the organisation, does not need to validate a second time. Only involved at CIP. Has never declined a student that has been approved by a coordinator. Head of the study board can send applications to other departments or education if the student is rejected, but deemed suited for another department.	Has the final word (CIP). Has the role of possibly redistributing applications if declined.	Has the ability to prevent the process from stopping when an application is rejected, by sending it to another education.	Administrative part of the organisation.	Not aware of any problems.	N/A

Figure 3.1: Stakeholderanalysis.

This section analysed the stakeholders and what their role in the process/organisation was. The conclusion is that the the process involves 3 administrative parts and one validating. Reasonable questions could be, why the process needs so much administration and how it can be so difficult to assess whether or not an international student should be admitted? Despite all the people complicating this process, in the end, it all comes down to one person judging whether a student is qualified. In the following section we will determine what the problems are complicating this process.

3.3 Problem identification

This section lists the problems found in the different parts of the process, based on the involved stakeholders opinions and workflows. This is done with an consideration to the questios above. The problems presented in this section are supported by interviews and email correspondence with the international office, department secretaries and different coordinators. It can be found in appendix C, D and E.

International Office

According to the second interview with the International Office, there can be a considerable difference in the time various departments take to process an application. This makes it hard to use the same workflow with all applications.

The International Office does not demand the departments to follow any specific process, when handling an application, which leads to the departments doing it in different ways. There are no permanent staff to handle the existing technical systems, according to the secretaries at the International Office. Therefore, it is only supported by the kindness of the former technical supporter at this department.

The hardcopy of the application is send to all the involved departments of the university, despite a large part of it being digitalized at the initial arriving point at the International Office.

When an application is approved, the student is admitted at AAU. This is a problem because the student does not actually need to show up at AAU if they are admitted at another university also.

Secretaries

The secretaries at the various departments use self conducted solutions to handle the process. At one department, the secretary uses post-its to keep track of applications, at another, a common calendar is used, and at a third department, the applications are organised in a pigeon-hole, which have to be checked on a regular basis.

The secretaries tend to make their own digital copies of the applications, when they receive the hardcopies. They do not get the digitalized information, that the International Office have made.

Coordinators

There is a substantial difference in the ways coordinators handle the applications. At some departments, they both request additional information directly from the student, along with contacting the secretary. In other departments, the coordinators always go through the secretary, when needing supplementary information.

At least one of the coordinators accumulate the number of applications waiting for approval, before handling them, because of the time it takes to process them separately.

Coordinators tend to check the linguistic skills of the students, despite the International Office already doing so. Some coordinators strictly follow the official requirements regarding the skills, while others include the context of the students in the assessment.

Departments

Different departments have different ways of approving the applications. Some places, the coordinators judgement is sufficient to approve, while another department always gets approval from the study board.

According to a secretary at the International Office, there have been two cases of an application disappearing in the administration process of the university during the last 7 months. It is the standpoint of the International Office that whichever department loses the application is responsible to procure the information anew. Apparently, there really is no process owner, that have the executive responsibility of the admission process.

Current IT support of processes

The current IT support of the processes has different problems. Just by looking at the description (see section 2.4.2) it becomes clear that the current IT support is very static. It is a system to store information and the system does not do anything proactive with the provided information itself. It stores information and provide the opportunity of simple extracting for letters or other systems when asked to. Actually an easy comparison to the current system is an old fashion file cabinet. In this file cabinet additional information to the core information, that the hardcopy of the application is, are digitalized and stored.

The current system only provides the stored information to the International Office. The departments provide information to the system, when doing the online evaluation. However, they cannot extract any information from it. The departments that we have interviewed had almost no IT support, although one department had done the obvious and digitalized the hardcopy. It provides them a backup copy of the hardcopy and an archive of previous applications, that the coordinators at other departments wish. Storing and providing of the hardcopy are to support the core processes, however, the stored information in the current system generally is additional, and do not support the processes a great deal.

3.3.1 Problem themes

We have made problem themes based on the found problems. These themes is listed and described below. The main point for this is that we do not wish to solve individual problems, but rather look at a wider perspective, and thereby solving general problems.

- **Process management**

The university has no overall structure for who owns the process. This means, that when the application reaches a stakeholder, it is their job to administrate it. The problem is that no one has an overall picture of the process.

- **Digitalization**

Another problem that arises is that the paperwork which is in circulation at the university has to be shipped manually. This means that its prone to a lot of problems. First of all, the documents could be lost and without any form of backup of the core information. Therefore the student must send a new one. Secondly the International Office does not provide the already digitalized information to other stakeholders.

- **Standardisation**

Most of the problems can be categorised under this theme. There is no standardised way of doing things, which could lead to wasted resources.

3.3.2 The gap

This section will present an analysis to enlighten exactly where the gap is between the problem themes and the visions of AAU (see section 1.2). This has been formulated into paradoxes. Clearly the gap should be filled out to accommodate the visions. This will also provide motivation, and indicate where the focus should be for the rest of the project.

Paradoxes found and listed:

- According to the strategy, the administration should be carried out as closely as possible to the managers and environments. Why then, does the university need the International Office, if the administration should be handled in local departments?
- According to the strategy, equal rights should be a framework condition that ensures equal opportunities, yet some stakeholders seem to differentiate between some students, regarding their potential lack of linguistic skills.
- 1 out of 10 students at the university are foreigners. With this many international students, why are the processes not standardised?
- According to the strategy, a future strategic step will be to extend the level of internationalisation. This will only argue a need for standardisation of the processes.

3.3.3 Delimitation

This project will be further delimited, when compared to the initial problem (see section 1.3). Regarding this different factors are considered:

- First of all, the time limit is to be considered. The initial problem domain has a rather broad aim, and therefore there needs to be a delimitation in exactly what problem areas that needs to be included.
- The interviews performed with the international students did not identify any major problems, at least not within the scope of the problem domain.
- Due to the limited time frame of the project, it will be wise to settle for an implementation plan, instead of doing an actual implementation.

Based on these factors, the project will be limited to only consider the administrative part of the admission process. This means that only the internal processes that takes place on AAU will be involved. Also, the project will produce an implementation plan to show how an IT-system should be implemented.

3.4 Problem statement

This section will consider the analysis and delimitation. It can be formulated into the following problem statement:

“Can an IT system be realised to close the gap between problems found and the visions of AAU?”

The following chapters will aim at answering this statement, recognising that the problems can be solved in a number of different ways.

3.5 Outline

The goal with this chapter was to analyse the context of the problem domain. The first thing that was analysed was the stakeholders. One of the things that should be noticed is that the only real validation is done when the application is at a coordinator. The rest of the stakeholders is merely administrative, processing papers and handling information. The analysis of problems (see section 3.3) revealed three different problem themes. Firstly process management, because of the lack of ability to control and have an overview of the process. Secondly digitalization, because of the huge amount of paperwork being send and sometimes lost during the process. Thirdly standardisation, because of the different ways that the stakeholders handles the applications, with no overall pointers to how it should be done. Below is a rich picture that illustrates the problems in the domain.

Rich picture is a terminology used to make general descriptions of a problem domain

in software development (Avison1, Golder and Shah, 2009). Different description styles can be used, but in principle, the picture should be of such a graphic quality, that even non-developers can benefit from it. In particular it supports the domain experts in better describing their area of expertise (Finegan, 1992). However recent studies have shown that developers tend to ignore the findings in a rich picture session later in the process (Marchetti, 2010). This concern will be addressed in this project as well, so we will use this tool to emphasise the importance of unified understanding of the problem domain with the users. A rich picture regarding this project can be seen in figure 3.2. Every time "Crossing Swords" are presented, a problem has been found. In the picture we follow the paths, an application from an international student follows.

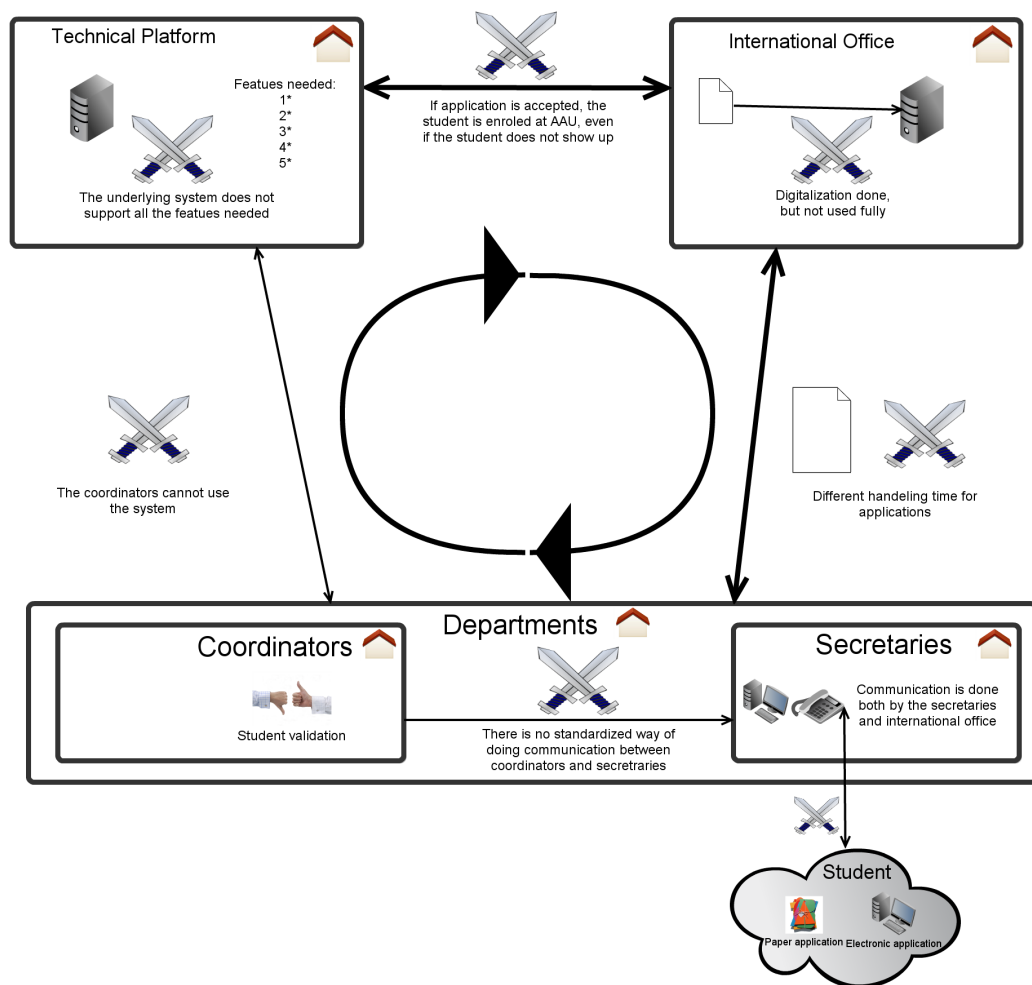


Figure 3.2: A rich picture, describing the domain and where the problems lie. "Crossing swords" are problems.

From what we have analysed in this chapter we have set up a set of paradoxes to enlighten a gap. These paradoxes see section 3.3.2 lead us to further delimitation of our project. If AAU wants to accomplish their visions they need to close this gap. Therefore this resulted in a problem statement " Can an IT system be realised to close the gap between found problems and the visions of AAU;". The rest of the report will address this question and how to solve it.

4.1 Introduction

The overall goal with this chapter is to present different ideas, for what a solution could look like. The chapter will address the question “Can an IT system be realised to close the gap between found problems and the visions of AAU?”. This includes supporting the ideas, with different theorists. In the end this should result in a couple or more scenarios that can form the basis for a solution. An important thing to stress out is that this chapter will not give a concrete solution, this will be addressed in the next chapter.

4.2 Reasoning

A question arises, why try to solve something that is basically working? The answer is right at hand, to try to accommodate the visions of AAU. In our analysis we came to the conclusion that there were certain problems. AAU should adjust it’s current processes in order to cope with the vision that they want to expand their international relationship.

This is made clear when Larry E. Greiner, in his paper “Evolution and Revolution as Organizations Grow”, points out the key forces in development. Here he argues, that it is not only outside forces as explosive markets and technology advances that influences the organisation strategy. He says that structure also can play a critical role in influencing strategy. He thereafter points to five key dimensions for development including age and size of organisation, stages of evolution and revolution and growth rate. It is especially interesting to look at the evolution and revolution stages. As a company is expanding it meets an evolutionary period, that is, a period of time where the organisation enjoys some years of continuous growth with no major maintainment to accommodate it. When a organisations size increase, it will experience a crisis, relating to coordination and communication. New levels of management appears and jobs becomes more interrelated.

To overcome these problems Greiner says the key is the Revolutionary stage, that is a turbulent space between smother periods of evolution. The critical tasks for the management are to realise, that such periods are at hand and to find a new set of organisation practices that will become basis for managing the next period of evolutionary growth (Greiner, 1997).

The remaining question must be weather AAU is in an evolutionary period, or on a brink of a revolution? Apparently, there are no problems in handling the amount of work in the present process. Rather there are some inconveniences that makes the process less than optimal. This indicates that the organisation is in an evolutionary period (Greiner, 1997). The solution must be to adjust existing workflows and processes, rather than implementing fundamentally different structures in the organisation so that the evolutionary period can be maintained.

4.3 Ideas

When dreaming of a solution we first need to look at the problems themes described in the last chapter. The following bullets will describe our solutions to each of the problem themes. Different theories are looked upon as an argument for making such a solution.

Process management

To solve the problem of process management we will consider several solutions. First of all we want to integrate the underlying system so it can be used as a process management tool. The system will keep track of the process so a process owner can see exactly how far in the process a given application is. The process owner is a central point of contact for the process, with a responsibility to manage end to end processes. A process owner can have different roles throughout the organisation.(Snabe et al., 2009) In this case it is to manage the process, that is, keeping track that everything proceeds as it should.

The system should handle as much as it can by it self, this includes notifications, data, enroll students to STADS and so on. By using computer systems more thoroughly, the organisation will be less vulnerable to personnel turnovers. That is because of the migration of process knowledge from employees to the system (Simon, 1991). If the knowledge about a certain process is stored in the heads of employees, that knowledge can be lost when the employee stops. Another point of view is that the cost of training new personnel to handle processes is much larger than the cost to have computer systems handling the root of the problem. The point is that you do not have to teach new personal current processes, since they are embedded into the system (Simon, 2001). When modifying the process, it is important only to include components necessary to complete the tasks at hand. Division of work and responsibility should only be done when required. Naturally, the different organisational roles need to exist, such as coordinators that validate and secretaries that facilitates distribution in the administration (Simon, 1976).

Digitalisation

To solve several of the problems regarding digitalisation, we will first consider the problem. All applications must be sent in paper form, because they need to be validated to make sure that they are real. The distribution of the hardcopy has also led to loss of the application resulting in unnecessary waiting time for the student. The documents have to be validated because the coordinators need to confirm that they are real. To solve this we imagine a solution where all documents are scanned at arrival, at the same time a competent person that checks the documents, making sure that they are not fake. The digital copy is then sent out to the institutes instead of the hard copy. This will spare the secretaries and the coordinators time in the end, since they do not have to move a hardcopy around the university. Also the overall process will not be prone to errors as an application is not easily lost. The hardcopy is filed and can be requested if needed or questions arise.

Standardisation

The last thing that we will look into is standardisation. An argument that speaks in favour of standardisation is that removing the possibility of alternatives to the user, for example by simplifying the process, you can reduce costs in time and effort, and also less can go wrong. Increasing the simplicity of the process by letting a system handle more decisions, is therefore desirable (Simon, 2001). First of all we need to look at the current processes. We did this in the Define chapter (see chapter 2) and highlighted the problems with them in the Discover chapter (see chapter 3). The interviewed departments manage their processes in different ways, this resulted in different handling time of the applications. The solution could be to make a standard process that all the departments must follow, but also to shave away any unnecessary parts. This involves all of the stakeholders. When it comes to the technical system going to support the processes, it is important to design it in a standardised way, as opposed to the present systems, that each department has developed for their specific needs. Unlike human employees, the system will not intuitively adapt to processes, so it needs to be designed in a generalised manner (Simon, 2001).

Since there are so many administrative parts of the process, including the International Office, the secretaries and the study board. It would be an idea to cut some of them away, the question is, who should it be? An idea is to cut away the International Office, since a vision of AAU is that administration jobs should be carried out as closely as possible to the managers and environments. Therefore the idea is to let the different departments carry out the tasks of the application process that the International Office handles right now. Another idea is to keep the International Office because it is a central administration unit, that also services the students after the application process and cut away the department secretaries. The secretaries at the departments is administrative as the secretaries at the International Office, but unlike them they are not a central administration unit. They only serve as a link between the International Office and the

coordinators and is not needed if a system is implemented, that can handle that role.

Another consideration is the different ways that the departments handles the applications. Here we will consider the different departments and their handling time. At CIP they have a bureaucratic structure where the application needs to go through a validation process that includes a coordinator and the head of the study board. Keep in mind that the head of the study board never has rejected an application that is approved by the coordinator. That makes his job primarily administrative. Another department, CS, has only coordinators to validates. We want to look at these examples to find out which of them handles application the fastest. From our interview with the International Office it showed that CIP took the longest time to handle applications. Therefore the idea is to make a standard process that only involves coordinators at the departments.

Different scenarios comes into mind when we take the solutions into consideration, but what is an optimal solution? The choice of an appropriate solution should be the one that solves most problems and in best way accommodates the visions. The optimal solution should therefore include:

- An overall system that can handle the tasks that is currently handled manually.
- A process owner that can keep track of the process at all times
- Standardised processes that will make processing time equal at all departments
- A cut in the administrative parts of the process for example, the International Office or the department secretaries.
- A process that is not more complex than needed.

4.4 Scenarios

Scenarios with different approaches considering and dealing with the question mentioned in the previous section will now be presented.

- **Scenario 1**

The first scenario coming into mind is to implement a system and to keep the overall structure of the organisation, that is, keeping the International Office, the department secretaries and the study boards. The inconveniences with this solution is that a lot of unnecessary stakeholders are kept. Of course the overall process can be handled in a way so unnecessary parts can be cut down to a minimum, but that does not cope with the fact that the only real validation happens at the coordinator. This scenario can fore fill the visions though.

- **Scenario 2**

The next scenario that comes into mind is to change the structure of the organisation, cutting away parts that is not necessary. The solution is to cut away the International Office and letting the department secretaries handle that role. But this violates against the idea of a process owner, since the International Office is where the process starts and ends. If the department secretaries would have to become the process owner, the process would have an owner for each department at the university instead of one at the International Office. According to previous mentioned theory division of work and responsibility is not desirable. In this scenario the study board has also been cut away, because of the distributive role in the process, a role that can be filled by an IT system.

- **Scenario 3**

The third an last scenario, that we will address, is also an organisational change of structure. Here the idea is to cut away the secretaries at the departments instead of the International Office. The point is that the secretaries only function is to distribute paperwork. A task that a system could handle instead. This change in structure does not directly violate against any of the ideas mentioned in the previous section. On the contrary the theory shows us that unnecessary parts of the process should be cut away. Also in this scenario the study board is cut away.

Depending on the chosen solution the visions can be fulfilled. If a solution is chosen to keep the International Office and cut away secretaries at the departments and study boards it would violate against the vision that administration jobs should be carried out as closely as possible to managers and environments serviced by the administrative unit in question. If a solution is chosen to keep the department secretaries instead of the International Office it would violate against the idea of a process owner. The choice of a solution will be further addressed in the next chapter.

4.5 Outline

The overall goal with this chapter was to come up with different ideas regarding a solution with a base in different theorists.

The chapter addressed the question if an IT system could be implemented to close the gap between found problems and the vision of AAU. Different ideas for a solution were addressed with a reference to the problem themes mentioned in previous chapter. First of all, the problem of process management could be solved by implementing an underlying system that can keep track of the process and manage some of the current manual tasks. The most important aspect of process management is the introduction of the process owner. Secondly, the digitalization problem is addressed, if a new process is created where the hardcopy and notifications should be digitalized. This is done with an eye to streamlining the process and making the need to send papers manually obsolete. Third and last, the standardisation issue is considered. The idea is to make a unified process that cuts away all unnecessary parts of the process. The question is how to do this? The analysis identified redundant administration tasks that the stakeholders each executed. Therefore the solution must be to cut away some of the redundant stakeholders.

From the ideas three scenarios came to mind. The next chapter will chose a concrete solution from the scenarios and more importantly discuss why we have chosen this.

5.1 Introduction

The overall goal with this chapter is to choose one of scenarios mentioned in the previous chapter and to elaborate it further. This chapter will address the question "Can an IT system be realised to close the gap between found problems and the visions of AAU?". It will describe the solution with a base in the stakeholders, that is, it will describe their individual processes.

The description will not give specific requirements, but will only give an overall view. An elaborated description can be found in appendix A. This specification will give a more detailed overview of the solution described in this chapter. After this chapter we will take a step away from the analysing/designing phase of our project and take on a role as a supplier of a system. It is important to stress that in the real world the same persons designing a system will not be likely to implement it. The analyser/designer of the system delivers a requirements specification to the supplier. The supplier then responds with a solution to the requirements specification. Our requirements specification should be seen as an offer to the designers, a role that, given the scope of this project we will also take in the next chapter.

5.2 Scenario

This section will describe a chosen scenario, from the last chapter. Furthermore it will give arguments as to why we chose this scenario.

We chose scenario 3 see section 4.4. Cutting away department secretaries and the study board. The question is why we chose this exact solution. As a starting point one could have chosen solution one, that is, just implement the system. The clear disadvantage of this solution is that the problems will not be solved, and thereby not maintaining the

evolutionary growth. The process will work, but with a lot of inconveniences, that is, too many administrative stakeholders, therefore some of the stakeholders should be cut away.

Initially we thought about cutting away the international office because we want to fulfill the vision that stated, that the workload should be distributed as closely to the managers and environments as possible. This however obstructs the need to state a single overall process owner, that can take responsibility for the process. At the same time it will be difficult to ensure a standardised process at different department secretaries, hindering the principle of standardisation to be carried out. Therefore, the solution should make use of the International Office, at the expense of department secretaries. When looking at international students in a broader perspective, the International Office is also the closest administrative organ, regarding study independent issues.

This leaves the department secretaries with only tasks of redistribution paperwork. Therefore in our solution, they are no longer necessary components of the process, and should be left out (Simon, 1976). Furthermore the study board is also cut away because as we learned from the interviews this only complicates the process further. This compromises with one of the visions, but we deem this solution to be the most optimal based on the found theory. The following will describe the remaining stakeholders, the system in which a lot of the tasks has been moved and what role they have in the process.

Students

Initially the process starts at the student. S/he fills out an online application and sends the relevant material to the International office, at the same time an admission fee is paid. The student there after waits for an answer. When the answer arrives the student has to fill out an acceptance form whether or not he/she wishes to accept or decline the offer.

The International Office

The triggering event for the International Office is when it receives an application as a hardcopy. The first thing to do is to check what type of application it is, if it is a guest program the hardcopy is validated (that the contents is not fake) and scanned into the system. Afterwards a check is performed to see whether or not the student has paid the application fee.

After it is scanned the hardcopy is archived at the university. If anyone needs it they can request it later in the process. After that the secretary waits for a validation from the coordinator.

When the validation is received the International Office send a confirmation by snail mail with a request to fill out an "acceptance and arrival form". Unless the form is filled out s/he does not have to do anything further. If the form is no filled out, they have to

manually contact the student (the system has already sent a reminder once, but to ensure that there is no misunderstanding a manual check is performed to see if the student turns up anyway). They have to manually access the system if the student has shown up archiving him as active.

System

The system is designed so that the triggering event that starts a process is when a student submits an application. The system saves the application and checks if it is a EU-citizen an a Degree student. If it is the system will wait until it can get a confirmation from the international office that the money has been paid. If not it will wait for a hardcopy scan.

When a hardcopy scan is received from the International office, the system will send a reminder to the relevant department coordinator. When the system gets an answer from the coordinator it checks if it is approved, if it is it sends a notification by e-mail to the student. If the application is rejected, the system sends the application to another coordinator if the student has another study of choice, else it sends a rejection to the student. Afterwards it waits for the student to answer the arrival and acceptance form. The wait function has a timer so that it waits for example 2 weeks, and there after it sends a new notification to the student. If the acceptance form is returned and accepted, it enrolls the the student at STADS and sets him/her as active. If not the student is set as not active. In the case of a student not returning the form after the first try it sends a notification to the international office requesting a manual contact.

Coordinators

The coordinator has, as before, the role of validating the application, the triggering event is when a notification is send from the system requesting a validation. After the validation process, S/he has to notify the system about the validation.

The overall process can be found in pictures 5.1 and 5.2. The next section will specify the solution in a system requirement specification.

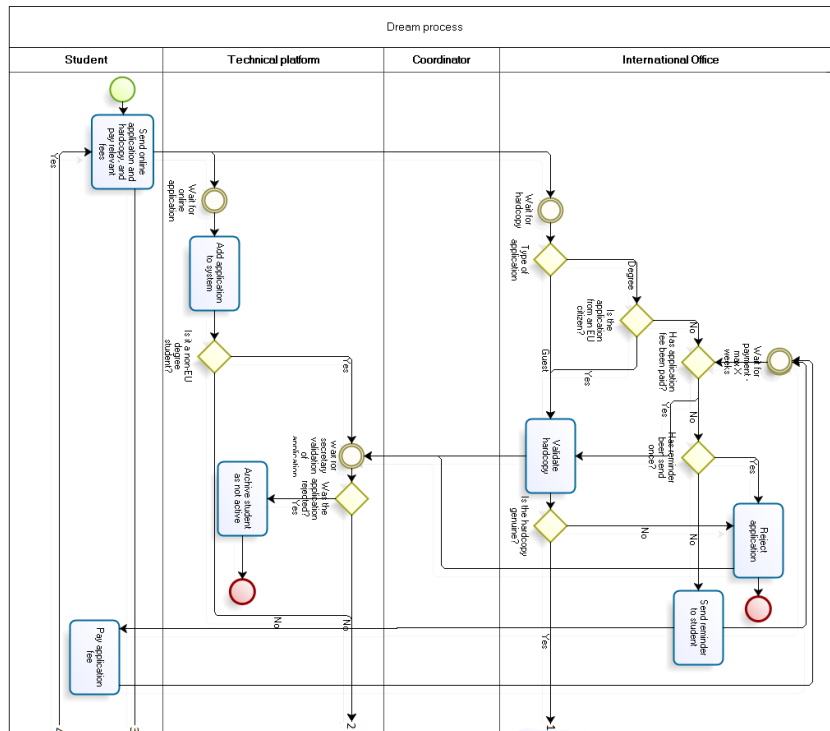


Figure 5.1: First half of the designed process model.

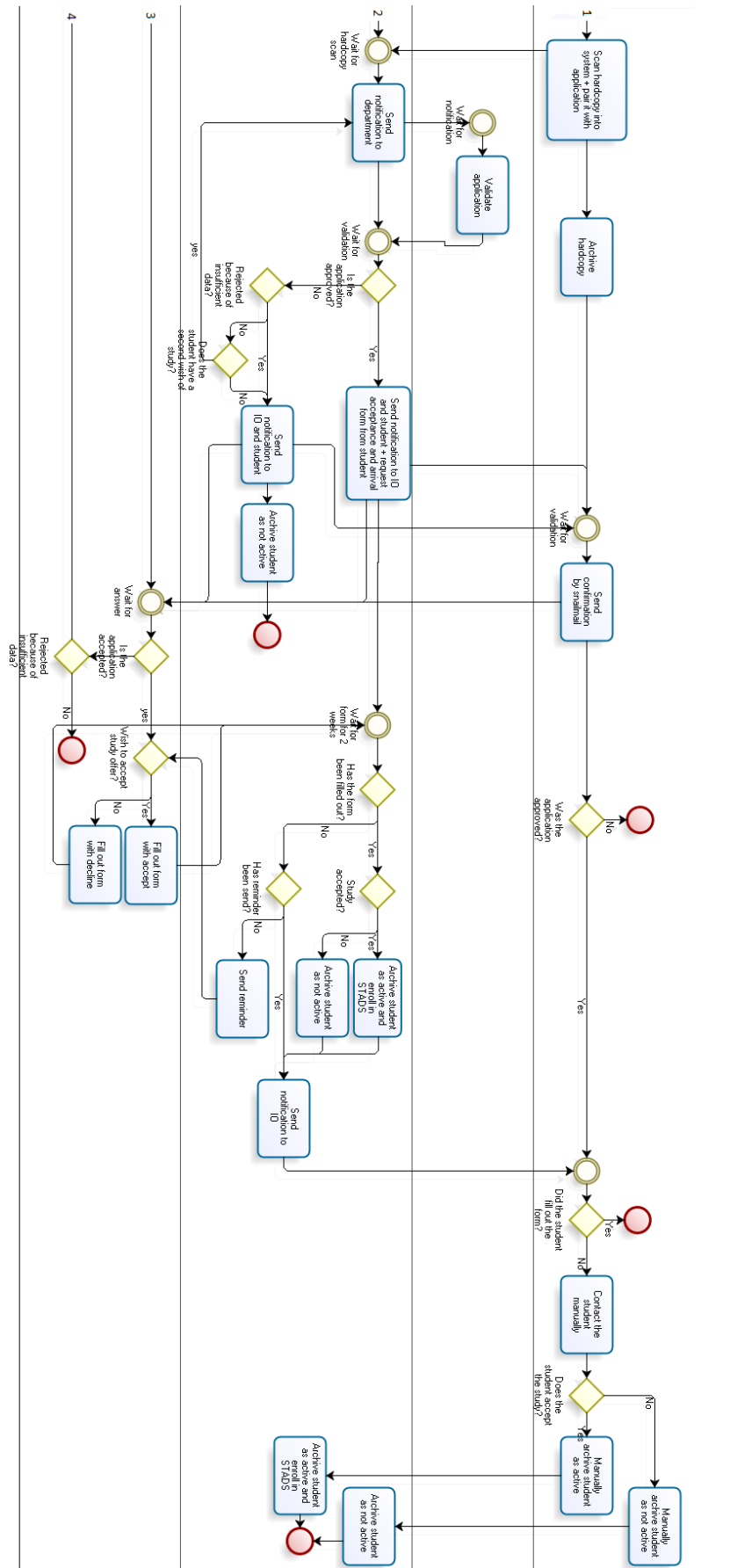


Figure 5.2: Second half of the designed process model.

5.2.1 Complications

So what's next? We have adressed many things in this report so far, but has not yet looked upon what the complications of a system could have on the organisation. In the article "IT-IMPLEMENTERING OG FORANDRINGSLEDELSE" written by Pernille Kræmmergaard Jensen, this subject is addressed. The implementation of systems can of course be a complex and cost-intensive affair and is to a greater extend an organisational evolution rather than a technology evolution. Under the implementation, the new technology can be met by resistance by the organisation and therefore could become a costly affair (Jensen, 1999).

New IT-systems has as a tradition been regarded as implemented when the system is set up. The focus has been on technical aspects, when all knowledge shows that it is on the organisational side that the problems arises (Jensen, 1999). The implementation can create new job functions, new processes, eliminate processes that is undesirable and so on. Therefore there can also be many transformations in the organisation regarding the implementation, which can lead to resistance (Jensen, 1999).

In the article Pernille points out the importance of the concept change management (Jensen, 1999). The idea of change management is to reduce the resistance, that is, actions that can hinder the use of a system. Pernille mentions three theories of what can lead to this resistance. The first has something to do with internal conditions e.g. employees being resistive to change itself. The second theory has something to do with existing conditions, e.g. the system being difficult to use. The last theory, originates in "interaction theory". The different scenarios concerning this theory can be a system that changes the balance of power in an organisation. The theory says that a system often will be rejected by the ones that loses power, and accepted by the ones that gain it. (Jensen, 1999). In our case the purposed system will have some difficulties regarding implementation. According to the three theories, the system could be met by people that do not like the system in general, the way that people has to interact with the system or it could be met by resistance from the people that loses power e.g. cutting away different parts of the organisation or by cutting in processes. The question is how we can overcome these factors. Pernille mentions several possible factors for solving such scenarios. The first factor is to involve the user in development of the system. The second factor is clear internal communication, that is, the leaders must take an interest in the employees working day and keep them updated, so that they do not lose an interest for the implementation. The third factor is to train the employees in the use of the system. A good training program is one that considers the individual employees skills and needs. The fourth factor is to give a clear message about what goals needs to be fulfilled in the future. An idea is to create small goals in the start that when accomplished can give positive reactions. (Jensen, 1999).

We have also given these factors a thought and has come up with ways to solve it. First of all the users (stakeholders) has to be involved in the development and implementation process. Also training programs has to be set up with an eye to employees

individual needs. It is important for the leaders to engage themselves into what is exactly happening in the organisation, to find out what could be wrong, rather than just think that its all fine. The last important goal is for the management to also set up clear goals for what they are attempting to get out of their solution rather than just implementing it.

5.3 System requirements specification

The technical requirements for implementing this process are described in the software requirements specification, in appendix A. Here one can find a set of specified functions for the system.

5.4 The purpose/goal model

The last thing we will look upon in this chapter will be the purpose/goal model(see figure 5.3). This will be adressed in order to describe the connection between the stated technical requirements and the purpose of the solution. Furthermore it gives an overview of the purpose of the project and why we have chosen to make the solutions stated in former parts of this report. It is based on a model introduced in the IPU course (Nielsen, 2010). The model can be interpreted from two points of views. Either top down or bottom up. If you look at the model top down you will see the main purpose "To accommodate the visions of AAU". This purpose can be solved by Extending internationalisation, giving equal rights for all students and making a good framework for international studies(the next level in the model). The next level gives solutions as to how the upper level can be solved. In contrast if you move upwards it gives a solution as to why these solutions should be implemented. For example should a process owner be a solution to central management, and central management be a solution to how you can manage the process.The upper half of the model (above the black line)l should be seen as purposes and the lower level should be seen as goals, that is, how we will solve it specifically.

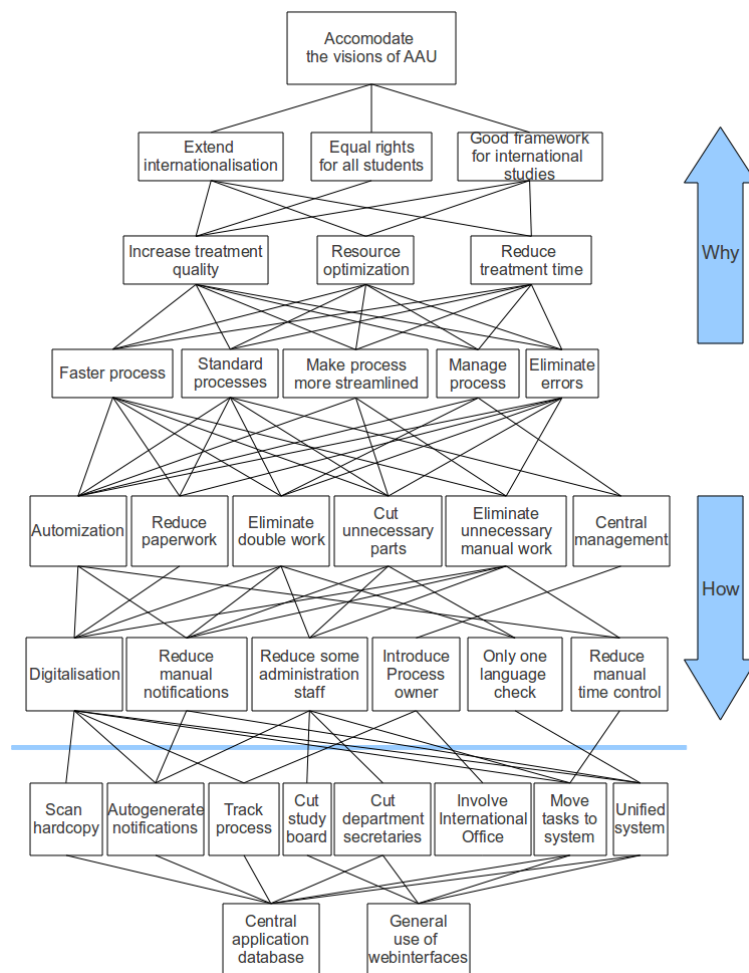


Figure 5.3: *The purpose/goal model, it can be read top down or bottom up. The goal is to either find the solution to the purpose(top down) or the purpose with the solutions(bottom up).*

5.5 Outline

The overall goal with this chapter was to choose one of the solutions mentioned in the previous chapter. We choose scenario 3, which is to keep the international office and to cut away the department secretaries and the study board arguing that the international office is the only instance in the process that have a general overview. This however compromises the vision that administration jobs should be carried out as closely as possible to managers and environments serviced by the administrative unit in question. If this vision is to be accomplished a different solution should have been chosen, maybe one that excluded the international office and kept the department secretaries.

Implementing a system can be a difficult task, considering the complications of it. It can often meet resistance when the leaders have not clearly communicated the message as to why the system should be implemented. Based on the found theory the focus also should be on the concept of change management rather than think that when its implemented the job is finished.

From a general perspective, and to answer the problem statement, can an IT system be realised to close the gap between the the found problems and the visions of AAU? It most certainly can, one only has to make compromises and not choose one process owner but several. The solution that we choose though, was with an idea that every process should have one process owner and that some of the work that the international office can not be cut away as easily, as the work done by the department secretaries. But the focus should not just lie at implementing a system based on the ideas of the management and what think is the best. A great challenge also lies in implementing the system. Here factors, as including the users in development of the system along with teaching of how to use it should also be considered.

6.1 Introduction

In this chapter, our role is different than it has been previously. Here, it will reflect what a software development company would do, when they have received the software requirement specification (SRS) (see section A). Therefore, it is needed to have read the SRS to get the right understanding of the chapter. The content of this chapter is rather technical, because it deals with technology. However, the context is also going to be reflected upon. Firstly, different possible solutions are listed and explained, then a solution is chosen and the choice is argued for. Next, the solution is specified in depth, by sketching the system using mock-ups and explanation of the technologies. Then the development process and an implantation plan are presented together with ideas for evaluation and maintenance of the system. Before the chapter outline, we will reflect upon the feasibility of the system and the consequences, if implemented in the context.

6.2 Possible solutions

When considering the SRS, there are different technical paths that can be chosen. By looking at the workflows, the main focus of the chosen path must be a highly supporting and proactive part of the process. The workflow model provided in the SRS is formed with BPMN, that are the supporting notation for BPM. There exist different frameworks, that are capable of dealing directly with BPM. These frameworks are often large, in the span of possible IT support being part of Enterprise Resource Planning (ERP) systems, and costly in acquisition and adoption. The frameworks are one way of thinking of a technical solution. Another way could be to look into the existing system, to see if there might be a potential of improvement by redeveloping. In this section, we will list both frameworks and their options, regarding a solution to the SRS, and take a look at the possibility of extending the existing system.

6.2.1 Frameworks

SAP Netweaver BPM

SAP is the market leader regarding ERP systems. They have designed a BPM component to the range of some of their ERP platforms known as Netweaver. This component lets you create models in your ERP system, from BPM based workflows. Thereby, executing and monitoring tasks is done standardised and efficient. Actually SAP Netweaver BPM lets you model, execute and monitor without the need to understand the underlying code. Your focus can be much more business oriented at the process, workflows and what is attached to that. All this ensures an IT support exactly as you model it. Netweaver provides a web interface for interaction with the system. Since SAP Netweaver is such a big, well-known and well-documented platform, it could most certainly provide some kind of system solution for the SRS (GLOBAL, 2010).

SharePoint with BPM integration

SharePoint is Microsoft's platform for collaborative sharing of knowledge, document handling, project management etc. The different tools in SharePoint can be connected in various ways, and create solutions for abstract problems or processes. In this way, you are able to model the system you need, within SharePoint's limits, which, to mention one beyond, could be accounting. Because SharePoint is developed with business in mind, it is possible to integrate BPM designed models into it. SharePoint is not fully supportive of BPM yet. However, the modelling is possible with great and trustworthy third-party software and even freeware. The different tools in SharePoint are spread among different versions of SharePoint, with thereby various prices. The system, that the SRS describes, will indeed be possible to model in SharePoint, because the system solution has characteristics of being collaborative document handling and case driven, and this is where SharePoint has it's forces. A standard installation of SharePoint will need some adaptation and development to fit the process (Corporation, 2010).

Oracle Business Process Management

Oracle is the strongest competitor to SAP on the ERP market, and oracle also provides BPM modelling for their business suites. Overall, the story is the same as with SAP Netweaver BPM. Which one is better is almost a religious question, and studies do not show a clear picture about it (ORACLE, 2010).

6.2.2 Extending the existing system

The existing system, as it is described earlier in the report (see section 2.4.2), does not support BPM. So it provides no shortcuts for implementing the processes from the workflow presented in the SRS. That does not mean it cannot be done. Considering the size of the workflow, and the functions a system should provide according to the SRS to ensure the desired IT support of the process, the technologies already being used can

cover it. As any other possible solution, this solution needs a deep understanding of the desired process and some development for a result, that is useful to all stakeholders.

6.3 Solution choice

When looking at the possible solutions, the SRS, and the current setup, the choice is easy. We choose the solution of extending the existing system, to ensure the IT support stated by the SRS. To support our decision, we will list pros and cons for the declined frameworks, and do the same for our choice.

Frameworks

Pros:

- BPM supportive.
- Well documented.
- Will be able to deliver the desired IT support.

Cons:

- Expensive in acquisition, development and implementation.
- Is equipped with functionality far beyond the needed.
- None of the mentioned frameworks are used in any way by the stakeholders already.

Existing system

Pros:

- Can be extended to deliver the desired IT support to the size of the system described in the SRS.
- Build on well-known and well-documented technologies
- The only expense is development.
- The current system and it's interfaces are known to most part of the stakeholders.
- The solution will be targeted to the process described in the SRS.

Cons:

- Not BPM supportive.

When pointed out, it becomes pretty obvious, that extending the existing system is the right choice. The only con regarding the current system, is that it is non-supportive of BPM. We consider BPM support in order to implement workflows to be unnecessary, when it is actually possible to model the desired system anyway. When keeping in mind that neither the frameworks nor BPM are used among the stakeholders already involved in the process, the purpose of a sudden introduction of such seems revolutionary. We will go deeper into the reasons for the choice and the consequences of it in our reflection, see chapter 7.

6.4 Solution specification

This section will describe how the chosen solution visually and technically is going to be constructed to fulfill the SRS.

6.4.1 Mock-ups

Firstly, we will visualise the extended system by presenting mock-ups of the different graphical user interfaces described in the SRS. The mock-ups correspond to the inputs and outputs from the SRS, and are presented in the order that they will appear, when following the desired workflow. The mock-ups are explained one by one in the list below:

1. The mock-up in figure 6.1 shows the interface, that international students fill out online, in order to apply to a study at Aalborg University. This mock-up, along with the other web interface mock-ups, combine the visual expression of the original application form, which can be reused, and the design dictated by "Design manual for Aalborg Universitet", as stated in the SRS.
2. The mock-up in figure 6.2 shows the interface, that a secretary at the international office browses to, when a hardcopy is received. From an initial superficial screening, the application is validated.
3. If the application is valid, a secretary at the International Office will browse to the mock-up showed in figure 6.3. In this interface, it is possible to add digitalised documents from the hard copy to the application in the system.
4. When documents have been added to the application, an email is send to the relevant coordinator requesting validation. A mock-up of how such an email could be visualised and worded can be seen in figure 6.4.
5. As stated in the email, the coordinator can choose to manually browse to the interface shown in figure 6.5, or access it directly by clicking the link. In this interface, all the provided information from the international student is available to the coordinator. The coordinator carries out a validation based on the type of material in this mock-up.

6. The next mock-up, as shown in figure 6.6, is a suggestion of how the auto-generated email, with the validation result, is sent to the International Office. This email is sent for notification purposes, as the International Office does not have to do anything active in the process at this point.
7. An email is sent to the applicant as well. A mock-up of this email can be seen in figure 6.7. If the application is validated, and thereby a study is offered, the international student must fill out an acceptance and arrival form, which is linked to in the email.
8. If the student does not fill out the acceptance and arrival form, a reminder is sent by email. A mock-up of this email can be seen in figure 6.8.
9. In order to get enrolled at the offered study, the international student must do something active. This is to fill out the acceptance and arrival form. The international student can also choose to reject the offer. Whatever the choice might be, it is supplied in the web interface presented by the mock-up in figure 6.9.
10. When the international student has made the choice, an auto generated email is sent to the International Office. This email states that the secretary must activate or archive the student, depending on the answer. A mock-up of this email can be seen in figure 6.10.
11. The web interface presented in figure 6.11 is where the secretary chooses either activation, which leads to enrollment of the international student, or filing the student as inactive.

Application form - International Office - Aalborg University - Mozilla Firefox

Application form - International Office - Aalborg University

Application form

Please note, in order to provide a better service, AAU has introduced an application fee for full degree students outside EU/EEA.

PLEASE NOTE: Your application will only be processed when the application fee of 105 EUR has been paid and we have received the hard copy application by normal post.

The application fee will be refunded if you are admitted and start at the programme you have been admitted to. The application fee is 105 EUR per applicant and the amount should be transferred to:

Danske Bank - Algade 53 - 9000 Aalborg - Denmark
 Reg nr.: 3201
 Kontonr.: 0009189629
 Swift: DABADK33
 IBAN: DK6730000009189629
 Payment reference: "Application fee" and your full name.

DEGREE STUDENT - APPLICATION FORM - FOR September 2011 INTAKE

Study period: from 01-09-2011 to 30-06-2013

Personal Information

Date of birth:*

Gender (male/female):*

Citizenship - as stated in your passport:*

Please fill in your first and last name in accordance to the following capitalisation rules: first letter in upper-case and the remaining letters in lower-case (e.g. Christina)

First name(s):*

STUDY PROGRAMMES

WORK METHODS

STUDENT LIFE

APPLICATION AND PERMITS

APPLICATION FORM

APPLICATION DEADLINES
 ENTRY AND ADMISSION REQUIREMENTS
 ENROLMENT PROCEDURE
 PROGRAMMES AND AGREEMENTS
 TUITION FEES
 SCHOLARSHIPS
 ERASMUS MUNDUS
 CITIES AND COUNTRY

ABOUT AAU

CONTACT US

ENROLLED STUDENTS

STUDIENINTERESSIERTE

WITAMY NA UNIWERSYTECIE W AALBORGU

Figure 6.1: Student interface - Application form

Secretary interface - International Office - Aalborg University - Mozilla Firefox

Secretary interface - International Office - Aalborg University

Secretary interface - International Office

Validation of application #applicationid

Consider following bullets:

- Does the information delivered by the online application correspond to the received hardcopy?
- Since this application is from and no EU citizen has the relevant fees been paid?
- Does the material provided by the hardcopy seem genuine?

If the answer is yes to all of these questions then press the validate button below:

If the answer is no to one or more of the questions please select the given ones below for notification purposes and then press the reject button:

Sufficient information provided by hardcopy.

Fees has not been paid.

Hardcopy does not seem genuine.

Additional information: (optional)

News
YOUNG PROFESSOR IN CREATIVE LEARNING

Happenings
"JULEFROKOST"

APPLICATIONS

HARDCOPY VALIDATION

APPLICATIONS TO BE VALIDATED

VALIDATED APPLICATIONS

ADD HARDCOPY MATERIAL TO APPLICATION

MANAGE STUDENTS

Figure 6.2: Secretary interface - Validation

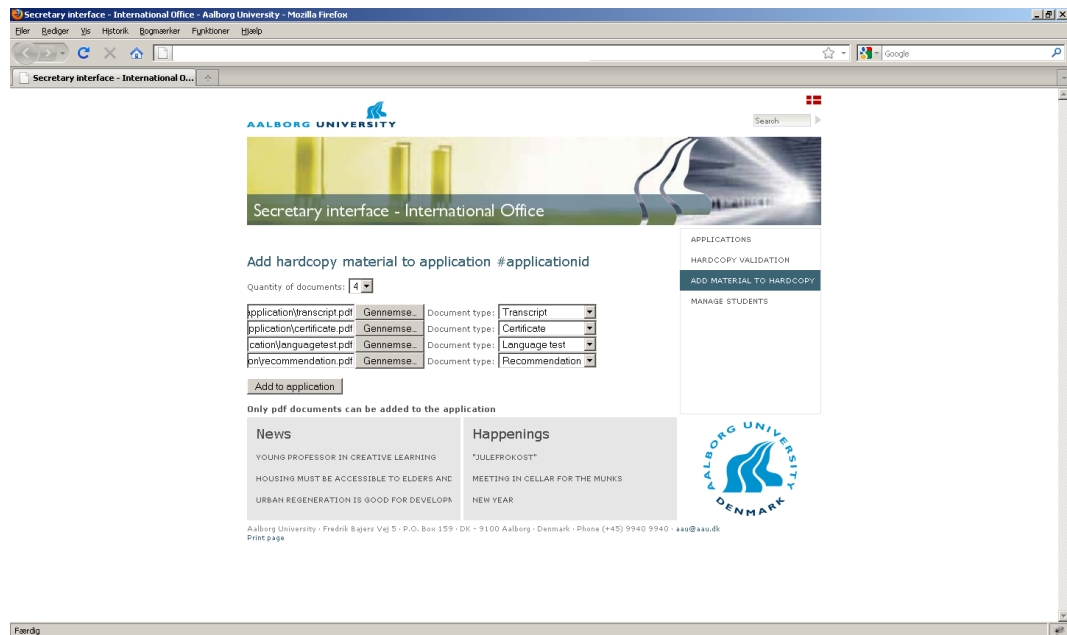


Figure 6.3: Secretary interface - Add material to hardcopy

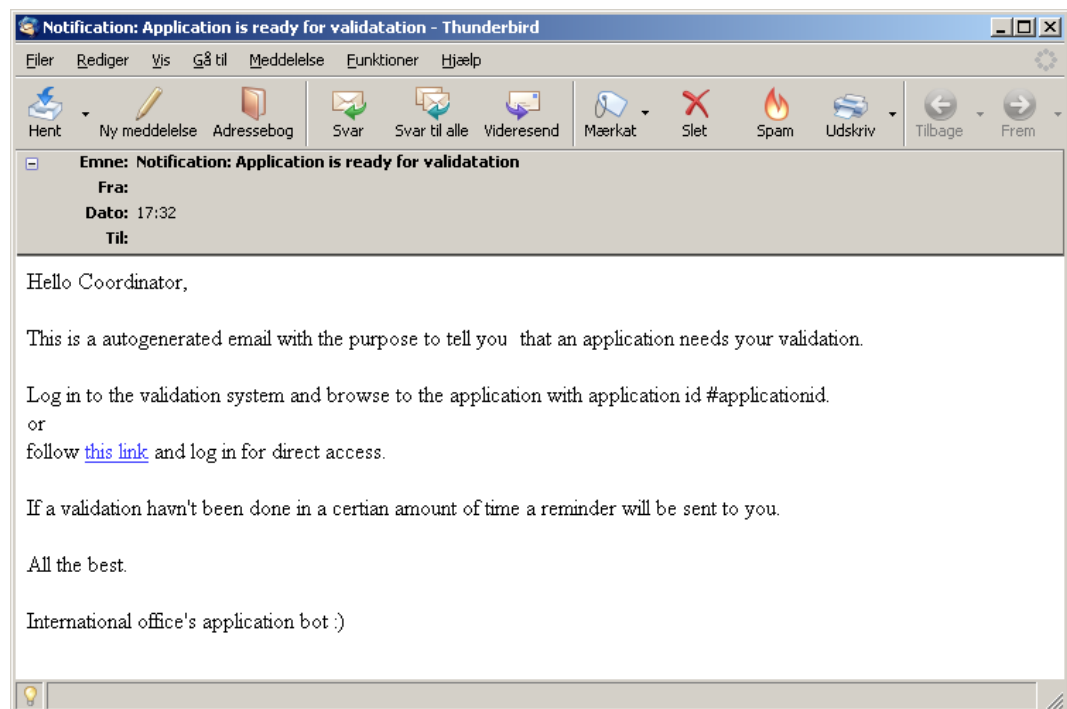
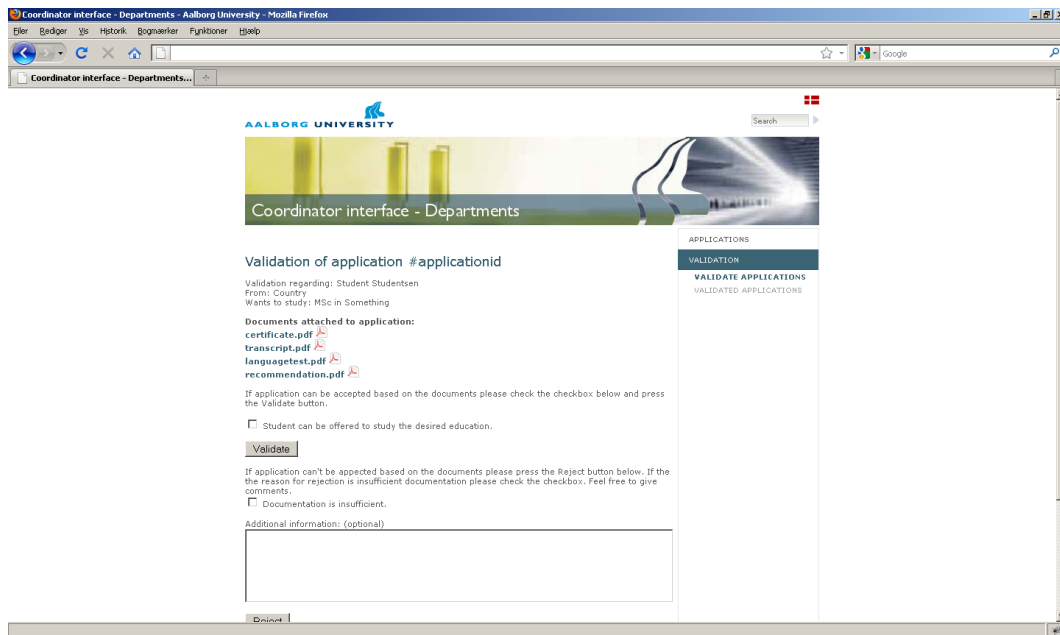
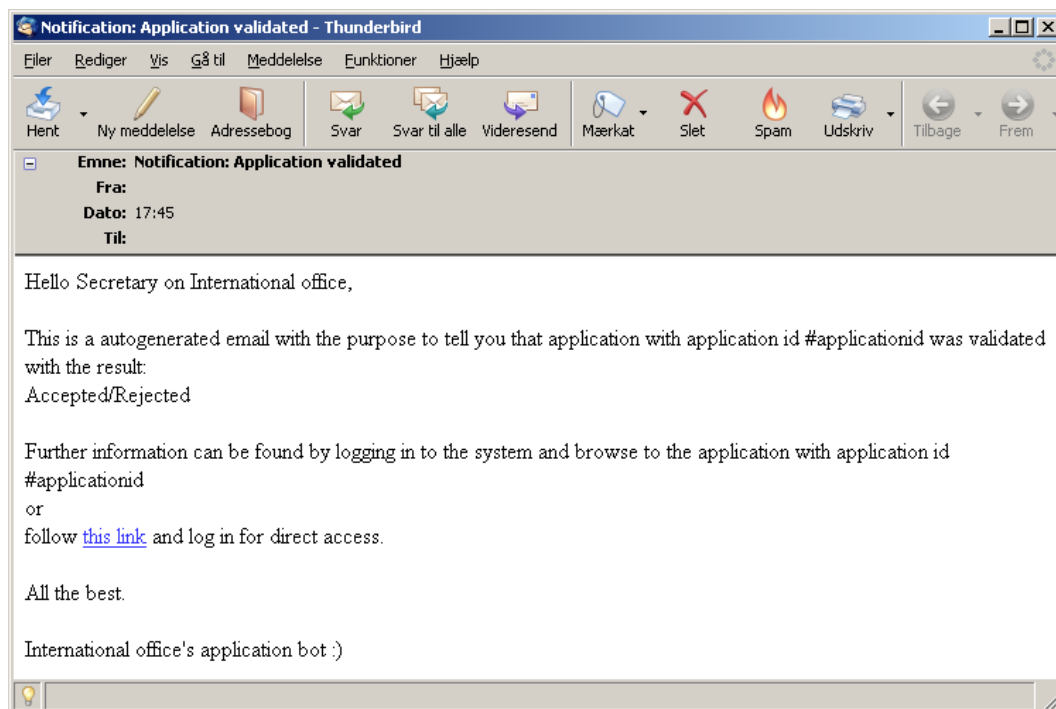


Figure 6.4: Notification - Request for coordinator validation

Figure 6.5: *Coordinator interface - Validation*Figure 6.6: *Notification to student - Application validated*

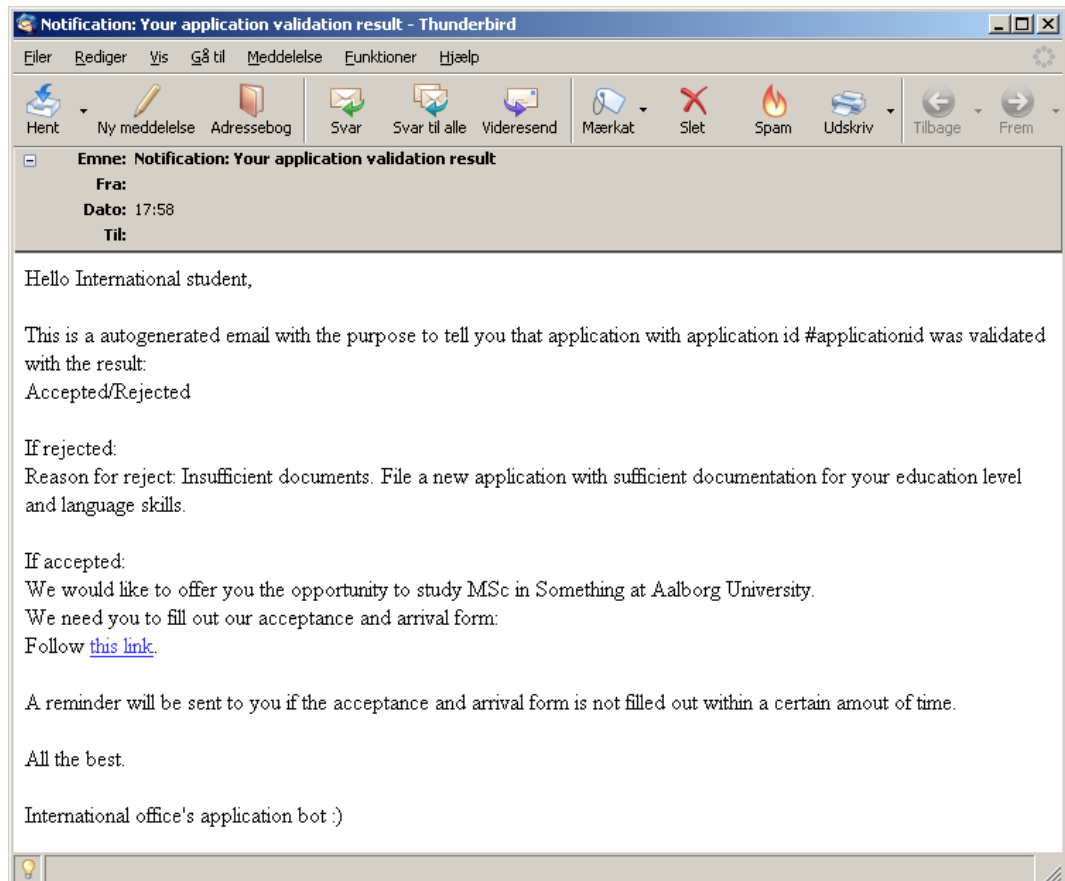


Figure 6.7: Notification to international office - Application validated

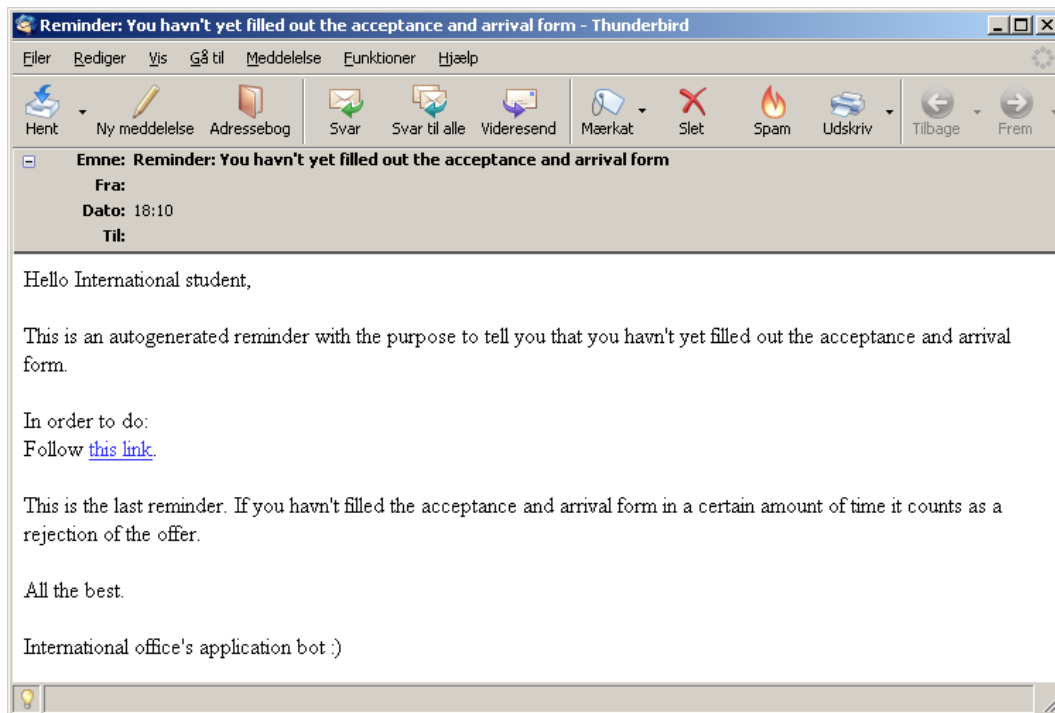


Figure 6.8: *Reminder to student - Acceptance and arrival form*

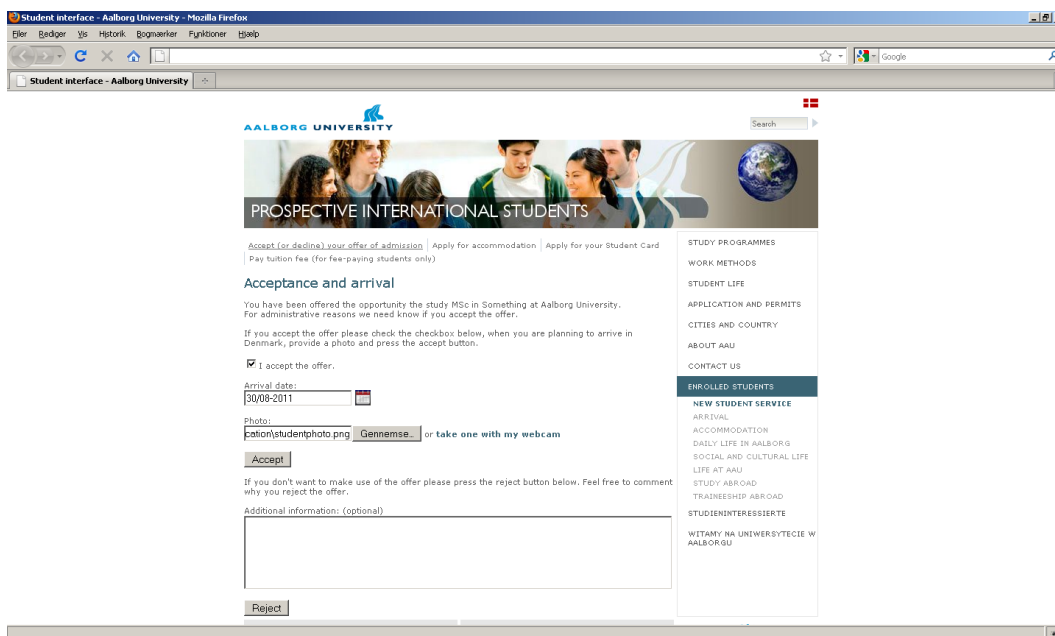


Figure 6.9: *Student interface - Acceptance and arrival form*

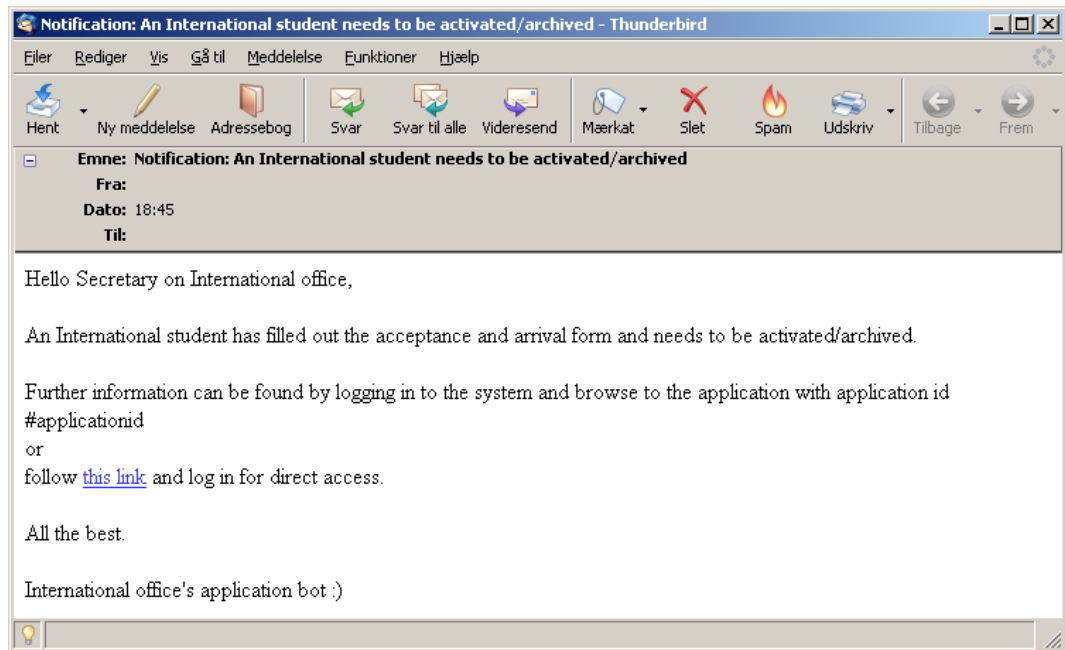


Figure 6.10: Notification to international office - Activate or archive student

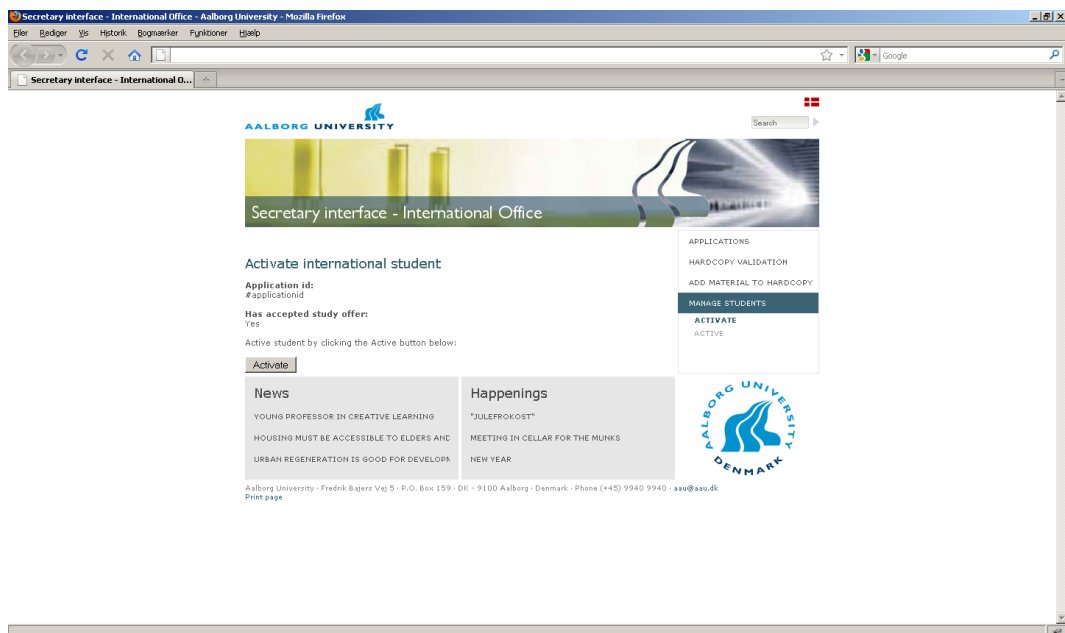


Figure 6.11: Secretary interface - Activate or archive student

6.4.2 Technology

The technologies described in section 2.9 are the same that are going to be used in this extension of the system. The development does not need new technologies, since the span of the current technologies is more than sufficient to produce a system matching the one described in the SRS. To support this, some large, well-known and well-working systems with different similarities, produced with the same technologies, can be mentioned:

- The International human capital management company Step Stone specialises in online job application software. For example:
<https://www.easycruit.com/>
- The Danish document handling system <http://www.e-boks.dk> provides the opportunity of different kind of documents being received and stored online.

Technology to digitalise documents, when validating authenticity, must be obtained, if not already existing at the International Office. Furthermore, it must be setup in such a way, that the documents end up at the right place. Also, it must be secured properly, in order to protect personal data. All major printer and photocopier companies such as Hewlett Packard, Brother or Canon produce devices that offer the possibility of digitalising documents, for example as PDF files.

6.5 Development and implementation

In order to fulfill the SRS, with a sufficient piece of software, plans for development, implementation, testing and evaluation are described in this section. The descriptions will include a presentation of methods, different estimates, and some tools to maintain and evaluate the system in the future.

6.5.1 The development process

The way of thinking software development today is dominated by two different paradigms.

The traditional paradigm handles the different activities, in a development process, one by one. These activities could be gathering of requirements, analysis, design, coding, testing, implementation and maintenance. An essential part of this paradigm is documenting each of the activities. One of the methods for handling the activities, is the waterfall model, which manages the activities in a reasonable order, when heading towards delivering a working system. Figure 6.12 shows how the activities listed above are managed according to the waterfall model. A reason to choose the traditional paradigm is that it fits well in a context, where the documentation can make way for binding agreements, for example in order to arrange payments. One of the downsides, by arranging a development process according to the traditional paradigm, is that the activities become closed circuits. When for example the gathered requirements are documented and

agreed upon, they cannot be changed, unless they turn out to be essential to the system (Pressman, 2001).

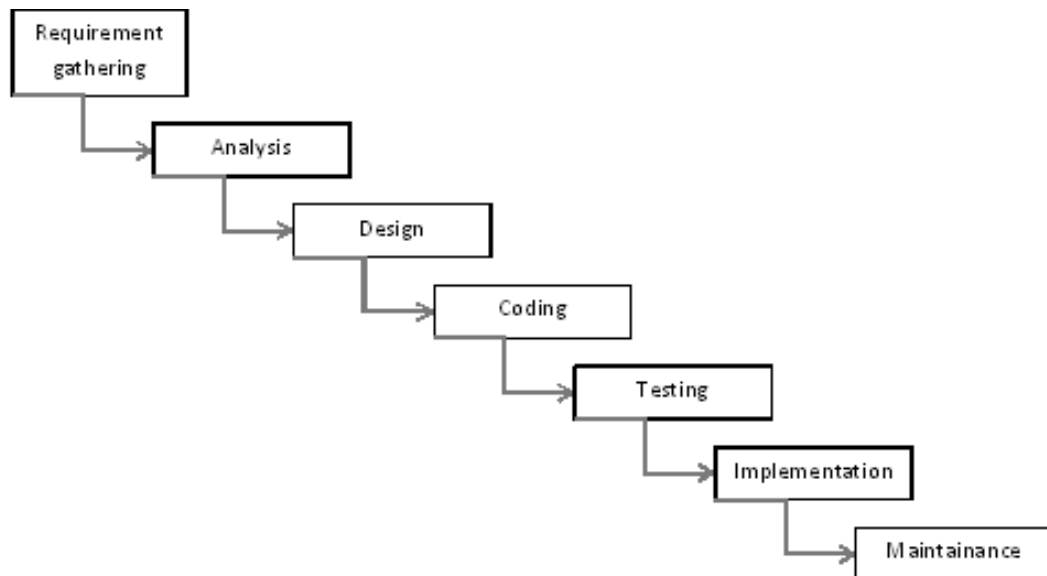


Figure 6.12: *The waterfall model*

The second paradigm is the agile paradigm. This paradigm differs from the traditional in the way it arranges some activities and the process. Documentation is not given the same attention as in the traditional paradigm. This requires that the developers program in a self-documentary way. The functionality of the software to be developed is the main focus, and therefore users and stakeholders are involved throughout the whole process. In the agile paradigm, there are different approaches to manage the activities. Scrum, Unified Process and eXtreme Programming are some of the approaches. The overall philosophy, regarding management of the activities, is about the same. If we consider the activities mentioned in the description of the traditional paradigm, requirement gathering and analysis are pre-coding activities in the agile paradigm as well. However, they are mostly used for planning reasons, since both things are likely to change during the iterative cycles. Activities as design, coding and testing are organised in these iterative cycles to meet the requirements. The cycles have a length adjusted to the current project. Implementation happens at the end of a cycle in some approaches, and after the cycles in others. An example of how to organise an agile approach can be seen in figure 6.13. A reason to choose the agile paradigm, is that user and stakeholder involvement, throughout the process, probably will secure the development of a usable and functional system, that all involved parties feel obligated to take responsibility for. A downside of the agile paradigm could for example, from an accountant's point of view, be justifying payment to the developers, when lack of documentation makes the results less obvious (Larman, 2003).

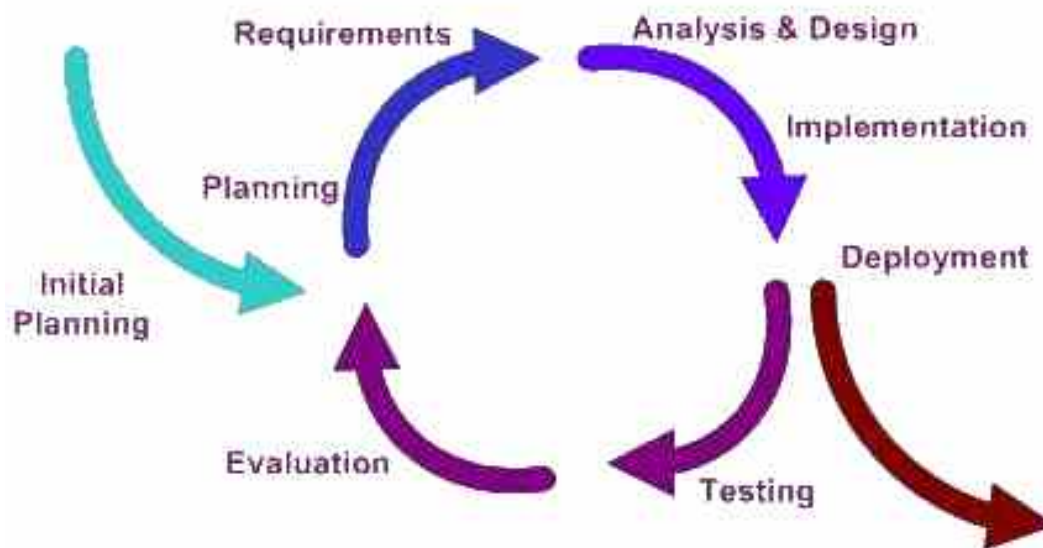


Figure 6.13: *Example of an agile approach. Model found at <http://www.software-development-resource.com>*

We would choose to go agile, in order to develop the system defined in the SRS. In the SRS, the requirement gathering and analytic part is almost completed. We would choose the agile approach “Scrum” (Larman, 2003), because it is familiar to us. Scrum plans the development process from the requirements and analysis in so-called backlogs. These backlogs functions as a management tool for a Scrum master, who is the team leader. We should use about a week to plan the process. Scrum works with iterative cycles as well, however in Scrum they are called sprints. Every sprint has it’s own backlog. A quick estimate is that we will need 3 sprints of a 2 week duration each, to fulfill all the requirements. We base this estimate on the size of the product, that is similar to earlier development projects we have conducted. That amount of time should be sufficient for the main activities and involvement of users and stakeholders. We will use acceptance tests among the stakeholders, to secure quality in the system, and thereby imbue responsibility of the system. Before the implementation process, which is described in the next section, we will make a quick estimate of what this part of the process costs.

We assume, that the stakeholders, who we want to involve, are willing to do this pro bono, even though they are from different departments or administrative sectors.

Our Scrum team needs 7 weeks of fulltime work in this part. Our qualifications, at our current state of education, entitle us to an hourly salary of 129.43 DKR (PROSA, 2010) (Steen Andersen, 2006). 4 student programmers, working 37.5 hours per week for 7 weeks, equals a cost of 136900 DKR ($4 \times 37.5 \times 7 \times 129.43 \text{ DKR} = 136900 \text{ DKR}$).

6.5.2 Implementation plan

In order to secure a smooth transition from the existing system to the new extended version, the development is done on a virtual server, which is a clone of the existing system and is placed in the same VMware environment. Technically, this means that the two systems can actually run side by side, and when the organisation is ready to use the new system, it is only a change of some addressing, that needs to be done.

Before this addressing is done, the stakeholders are able to receive education in the new system. An examination of the possibilities for digitalising documents, with the current equipment at the International Office, must also be performed.

Considering the technical circumstances, implementation is not difficult or time consuming. The implementation and education can stretch over a long period; however, we estimate that it equals a week's work for the team. Economically, the implementation cost equals 20000 DKR ($4 \times 37.5 \times 129.43 \text{ DKR} = 20000 \text{ DKR}$). An extra cost can be added, if equipment for digitalising document need to be obtained. We consider the price for satisfactory equipment to be 5000 DKR.

6.5.3 Maintenance and evaluation

When the implementation is done, and the system is running, there could be need for some support. A man hour of support can be bought for 129,43 DKR. Support covers further education, solution of critical problems, and things like that. Support can be offered within twenty-four hours on working days. It does not cover further development in any aspects. Ideas, wishes and demands will be picked up during support. We propose an evaluation seminar, involving the stakeholders, after the system has been in use for the first intake of international students. At this seminar, new ideas, wishes and demands, along with those picked up during support, are gathered, and, if necessary, a new development sprint is planned. Furthermore, statistics from the intake will be presented and compared to earlier statistics. We will propose a seminar after every intake. Our intention is to attend the seminars for free.

The estimated amount of support, during the first year of system use, is 100 hours. $100 \times 129.43 \text{ DKR.} = 13000 \text{ DKR.}$

Since the first year will include two seminars, we estimate that two times one week development sprints will be sufficient. $2 \times 4 \times 37.5 \times 129.43 \text{ DKR.} = 39000 \text{ DKR.}$

We estimate the need of support and development to be half the amount during the second year. $(13000 \text{ DKR.} + 39000 \text{ DKR.}) / 2 = 26000 \text{ DKR.}$

6.6 Consequences of solution

When looking at the statistics of the admittance of international students, it is clear that the existing way of handling them is flawed. When looking at the numbers regarding the fall of 2008, 503 degree students were admitted without conditions. Only 41 of these stated their acceptance of the study, while 155 actually showed up. When looking at guest students, the tendency is the same. 356 were admitted, 32 accepted, while 260 showed up, see appendix F.

The technology chosen to fulfil the requirements, are standard and well known. It will not require specialised IT support to handle. That being said, we suggest using our support plan, as described in section 6.5.3.

One of the main reasons for choosing the agile paradigm to the development of this system is that it will follow and at the same time improve the existing mindset according to the existing system. The way the existing system is developed is agile in the word's original meaning and not according to the paradigm. There is no actual documentation besides what the current developer has in his head. This seems to fit developer and the international office which is the stakeholder with most IT support of the current system well. The extension of the system developed according to the agile paradigm will put some management to the process and provide some form of documentation along with keeping the informal atmosphere considering the system.

Department secretaries are removed from the process, leaving them to handle other administrative work.

By using a unified central system, the need to send the physical hardcopy between departments, and between department personnel, is removed. This reduces the workload of the internal postal service, as each hardcopy at the current moment needs to travel from the International Office to the relevant department and back again. Furthermore it has to be distributed internally at the department, between secretaries and coordinators.

The unified system also removes the need for unofficial decentralized solutions at departments currently maintain, as all information will be available to all stakeholders.

The system will aim to minimise the amount of manual notification handling and decisions from the International Office, thereby letting them handle other administrative work.

By changing the system, as stated by this project and solution, students are not automatically admitted when their applications have been approved. The process focuses on getting their stated acceptance, in order to make it clear how many should be expected to show up at study start. Hereby giving International Office the opportunity to

check up on the acceptance and arrival form, send in by the students. Therefore, the new process reduces the amount of after-admittance activities regarding administration, such as creating study cards and enrolling students, that occur when the acceptance and arrival form is not used.

There is no doubt, that this system will free significant amounts of administrative resources. However, giving an exact number of these will be difficult. It will require everyday measurements, both before and after implementation. Furthermore, the system will improve the quality of the administration, as it minimizes potential errors, resulting from manual handling.

When looking at the tuition fees for International Students (AAU, 2010*d*), it is clear that it does not take many applicants to finance the implementation of the system. With the fees ranging from 45000 DKR to 108000 DKR per year, a flawed administration can be costly. Therefore, we believe our system to be highly feasible, but of course it is up to the product owner to decide whether he should make the investment.

When looking at the workflows of the redesigned system compared to the existing, it is clear that an improvement has been made. The existing system has 6 administrative tasks at the International Office and 6 to 8 tasks at department secretaries in a best case scenario. In a worst case scenario, the numbers are 11 for the International Office and 10 to 12 for department secretaries. This makes a total of 12 best case tasks and 35 worst case. The redesigned system has 4 tasks at the International Office in a best case scenario and 7 tasks in a worst case. As it does not use department secretaries, there are no administrative tasks regarding them.

In the existing system, “worst case” indicates that the student has not supplied sufficient documentation in the hardcopy, is a non-EU degree student, has forgotten to pay the application fee, does not get accepted on first choice of study, meaning that it will be handled twice by a department, and does not fill out the acceptance and arrival form. Additionally, there is a risk of the application getting lost in the distribution between departments, without anyone noticing it.

In the redesigned system, “worst case” indicates that the student has not supplied sufficient documentation in the hardcopy, is a non-EU degree student, has forgotten to pay the application fee and does not fill out the acceptance and arrival form. In the case of insufficient documentation, the application is rejected with a stated reason, and the student will have to send an application again, therefore inducing more applications handled when compared to the existing system.

Based on this, the redesigned system uses only a third of the amount of tasks compared to the existing system, in best case scenarios. In worst cases, the redesigned system handles twice as many applications, but this still only equals to two fifths the amount of the tasks in the existing system.

Considering that the salary of a secretary is about 150 DKR per hour, it will therefore take between 2140 and 2380 hours of administrative work regarding applications, to finance the system, based on the task comparison.

6.7 Outline

The possible solutions, that we have presented in this chapter, included some frameworks from major software companies, and the possibility to extend the current system. We choose to extend the current system, using the existing technologies, since this was possible and seemed like the right choice, considering the size of the project.

The solution choice was presented by using mock-ups, to give a visual impression of the system to be developed. The technologies, which are going to be used, are the existing, and the only new technologies, that may be introduced, are to digitalise documents.

In order to develop the extension of the system, the agile paradigm is chosen. The agile approach Scrum is going to be the management tool. Using this approach means that the development process is split up into iterative cycles. The price of developing and implementing the system is summarised in figure 6.14.

At last intake, 75 percent of the international students arrived without the International Office was notified. That, along with other administrative hurdles, is reduced by implementing this system. It is hard to measure the economic benefits of the reductions, that should make up for the cost of 214000 DKR. The system costs over the first year stand out seen with an accountant's eye. Therefore product owner must consider many aspects, when taking the final decision of investment. From an accountant's perspective, looking into figure 6.15 might give reasons to invest in the system.

System costs	
Activity	Cost
Development	137000 DKR
Implementation	25000 DKR
Support and maintenance, 1. year	52000 DKR
Support and maintenance, following years	26000 DKR
Total cost, 1. year	214000 DKR

Figure 6.14: *Costs of system development and implementation.*

Potential financing through improvements		
Improvement	Units	Comment
Application administration time to finance system through reduction of work	2140 to 2380 hours	Based on secretary salary and comparison of administrative tasks in workflows.
Number of international student semestres saved, to finance system	Between 4 and 10	Based on intuition fees of international students.
Number of applications saved, to finance system	Between 1 and 10	Based on the above estimate and the variance of study length.

Figure 6.15: *Potential financing through improvements by implementing the system, measured in units to break even.*

7.1 Discussion

It has been particularly difficult to perform an organisation analysis, to describe the organisation theoretically, since we have had no previous teachings in this field, what so ever. One of the leading elements of this project has therefore required us to start from scratch. This meant that we needed to find a lot of material, regarding organisations, simultaneously with the data gathering and analysis. This has prompted a lot of resources being spend gaining knowledge about basic theories regarding organisations. The question is whether or not we would have gained any benefits, if we had had a basic understanding from the beginning. Our believe is, that with a basic knowledge from the beginning, we would have had the time to use more specific theories, and would have gained a deeper insight of the problem domain.

We started with little knowledge about the problem area, and with an idea, that we wanted to collect as much data as we could, before the deadline. But before reaching the deadline, we realised that the domain was so large, that we could not possibly cover all of it within the time limit. We achieved getting interviews with personnel at three institutes, along with the International Office, and three international students. In the end, we asked ourselves the question whether the resources spend on making a personal interview, with each of the stakeholders, could have been spend more rationally with other data gathering methods. Again, the problematique, of how much information that is actually needed, appears. Maybe some of the interviews could have been done with a questionnaire online, or on paper. Especially the international students come to mind. They were hard to track, unlike the employees, that we knew to be at their offices, at certain hours during the day. Maybe if we had had a questionnaire, we could have just emailed it to them, minimising the need for us to go out and track them down.

Also there was a difference in questions for the employees and for the international students. The employees were often asked the question “what is your role in this process“, and they were then asked into “who is a part of the process;“. The international students, on the other hand, were asked ”Have you experienced any problems, regarding the admittance process? If so, what kind?“. We realise, that there is a difference in the two types of questions. The first one cannot easily be described in a few words, and the second one could be answered with relatively few words. Therefore, a questionnaire could have been an idea in this situation.

As mentioned before, we only had three international students to interview. From them we concluded, that they had no problems with the admittance process, and therefore we delimited the project, so that the students were not an active part of it. The question is whether we had enough data to make such a generalisation. Here, a questionnaire could also have been preferred, since quantitative data is a great source for making generalisations (Kvale, 1997).

A point of consideration is that international students, who have had serious problems with the admittance process, most likely have not been admitted to the university, and therefore we would not have been able to consult them, in order to identify problems.

As a consequence of knowledge about the organisational structure of AAU being picked up late in the project, we asked ourselves, could this have contributed to the interviews being conducted in a different way? Looking back on the interviews, it seems that we unwillingly have a tendency towards assuming all stakeholders to know each other, and in some cases have knowledge about specific individual procedures. The outcome has been, that questions regarding these matters often have remained unanswered, or answered with uncertainty. If we had had the present knowledge at the time, we would have had an understanding why, and not asked that kind of questions.

As we were conducting the interviews, we might have more or less influenced our stakeholders. That is, we might have pushed them in some direction, that is more solution oriented rather than problem- and context oriented. That is, we did not only ask “what do you do;“ but also ”what can be done to solve this?“. Therefore, some of the interviews revolved around solving a problem, and we did not clearly state, that the purpose was to find problems, not how to solve them.

Also, the selection of interview persons, without the explicit knowledge of their roles and position in the organisation, might have contributed as a source of error. In the beginning, this was based on a “gut feeling” rather than examination of the concrete conditions.

The data processing has also been a subject of discussion. The conclusion, at the end of the interviews, was that we would not do a full transcription, due to the project cir-

cumstances. The choice was made not to transcribe the interviews fully, but to take important phrases from the interviews, and use them in the analysis. This was done due to several factors. First of all, there is the amount of interviews. The number of interviews needed to be conducted was uncertain at this point, though we had an idea, that it probably would be more than a couple. Secondly, there is the time of each interview. The time of the interview can only be determined after the interview has been conducted. Lastly, the time limit is considered. A full transcription would take a fair amount of our resources. Therefore, we need to consider if it would be realistic, when looking at the amount of interviews.

Another thing, that has turned out to be a huge difficulty, has been the requirements specification. The project proposal suggested that it should follow a specific standard, namely the IEEE 830-1998 standard, which we do not feel is suitable for our project, for three reasons. The first reason is because of the IPU course at this semester. In this course we learned about different techniques to make a requirements specification. We learned that the IEEE 830-1998 is an old standard, that has been revised many times since it's creation. The second reason is that we were not actually taught in this specific standard, but in other, newer standards. The third reason is that the standard implies that you describe a system fully, which implies that we needed to think in more technical terms, than when doing the rest of the project.

The implementation plan also proved to be a difficult thing to assess. The project proposal suggested that the system should be implemented in SAP, a system we had little knowledge about. Therefore, we chose to make alternative suggestions, as to how it could be solved instead. On behalf of the amount of persons needing the system, we did not find a need for a SAP system, which is often a costly affair. It could be discussed whether or not one could have modelled parts of the process in a SAP system, but once again we did not feel that our experience with SAP were at a sufficient level.

The semester coordinator took on the role as product owner, and the fictive scenario was that he had ordered a SAP system to solve the problems. However, a SAP system requires the underlying processes to be clearly defined, therefore the product owner underlined that processes should be well described. It has also been a difficult thing to address so many areas of expertise at once, not because of lacking skills when using the tools (we have worked with requirements specifications and technical implementation before), but because of the project theme. It heavily focuses on finding problems and finding some way to solve them, by focusing on processes with BPMN in focus. There was a general tendency towards focusing on making the diagrams as correct as possible, which have taken a lot of resources, and it ended up being a waste of time. The models described the process, but we did not chose a solution that utilised them. The LUF course implied that when the models were created, one could more or less export them to a system like SAP, and get a working program. The only barrier was our lack of experience in using these modelling tools, and the fact that we knew little of SAP. In fact, at the

time of writing, 6 days before the hand in date of this project, we still have not had the last lecture in SAP development. Therefore, we evaluated our chances of making a SAP solution to be minimal. In previous projects, we have encountered similar situations, and found that we were best off describing the problem area with some kind of modelling and programming tool, that we were familiar with, instead of forcing BPMN onto something we could have solved in another way. The tendency has been to make a model, that we could not use afterwards, because of the lack of SAP experience. That being said, we realise the potential of BPMN being a great way of defining and analysing processes. This presented a relatively broad and abstract problem to us, because the former project work, that we have done, has been centered around lectures such as programming object oriented, user driven innovation etc. This problem however introduced a new way for us to work. We had to make interviews to understand the problem, rather than to solve it. The tendency at former project semesters has been “There is a problem, solve this with these given tools!”, not “I know there is a problem, but you have to find it, and you have to find your own tools!”. This shift in paradigm introduced many new considerations, that we were not used to. However, solving a large and complex problem, where you know little or no factors, has forced us to take another stand towards the project. We realise, of course, that this is the academic way of working, and this will only increase, as we get further into our studies. Due to the project proposal, we needed to undertake the roles as both consultant and developers of the system. A scenario, which is not likely to happen in the real world. Another problem, that we faced, was that the semester coordinator (Charles Møller) had a forced role as product owner. Charles is not part of the general board at AAU, which would normally be the ones to request such a system.

7.1.1 Work process

This section covers our work process, and the methods considered to manage it.

This semester we had a specific problem area. We had to work with admittance of international students at AAU. The project proposal consisted of certain problematics, that the semester coordinator in his role as a international student coordinator had experienced. The problems included student files sometimes going missing, and the uncertainty of whether or not a given student would show up at semester start. Charles presented his outline (Møller, 2010) for this on the first day of the semester. The first part of it contains an AS-IS analysis, intended to map the current structures, processes and stakeholders, regarding the lifecycle of international students at Aalborg University. With experience of being semester coordinator on the similar 5th semester of BAIT last year, Charles suggested that we started interviewing and gathering information right away. It seemed fairly reasonable, and without discussion, we chose to work and communicate this way. The International Office is a central player of the lifecycle, that we were to describe. Therefore, the first thing we did was to setup an interview with them. This interview was an initial examination of the lifecycle for us. However, it revealed to us, that it is the admission part of international students, that is process heavy. We focussed on the process, since it was the overall topic in our LUF lectures at the time.

With that in mind, we decided to delimit the project, to regard the admission process, rather than the whole lifecycle. Just from the first interview, this part seemed full of potential for improvement, and therefore, it was more than sufficient to cause a TO-BE solution design. The delimitation did not change, that we overall would follow Charles' outline.

At this point, our thoughts towards writing the report were scheduling the activities from the outline. This view were about to change. In the IPU teachings, we were confronted by a radical new approach to writing a project report. This method especially focused on not doing unnecessary writing work, and instead bring new ideas to the table at the very end. This technique encourages the actual writing to happen as late in the process as possible. The main objective is to focus all the energy on acquiring new data and exploring new fields of the domain, rather than putting a lot of information on paper, before you actually have any real insight. In this methodology, the first piece of the report to be written, would be the discussion and conclusion. The rest of the report has already been done, but it just has not yet been written. The idea is to make notes, as the project develops, and fill them into the report, when the writing period starts. Realising that many errors happen due to misunderstandings in the beginning of a project period, writing as late as possible helps you avoid this problematic. The communication of the project would be somehow self-creative, due to this method, and it would probably not end out similar to the one communicated through Charles' outline.

However, we have realised, that this writing technique requires an enormous amount of planning time, self-discipline and experience, since all documents float around in note form. We also realised, that you lose the learning-while-writing effect. This, however, was expected and true to the method. The time released from not-writing could be used to gain this lost insight instead. So about half way through the project, we switched to start writing, recognising that even though the above mentioned style would get the project a long way, it would not get us to the desired goal. Therefore, we found that a more traditional writing approach would help us to complete the project. Another factor contributing to not using the above mentioned writing technique, was our supervisor's lack of insight, due to no written material. She found it extremely difficult to guide us and aid us through different decision phases, realising that she had little or no written documentation available. In fact, a great deal of time ended up being wasted on explaining our thoughts and ideas to our supervisor, rather than discussing whether they were contributing elements or not.

Seeking a more traditional writing methodology, and deciding not to go back to Charles' outline, Charles actually, without being aware of it, provided a method through his lectures. This writing method is heavily based on our understanding of the 5 D's. To use it as a work method, and also a template to communicate this report, was now done without considering other communication possibilities. The first two D's, Define and Discover, roughly covered the work we had done at the time, and the work could be adjusted to

suit the method used as writing method. Experiences from previous projects have also been towards communicating the way we work. In those projects it has been more obvious where to place content regarding different activities, as for example the analysis. When using the 5 D's to communicate our project, the analysis should be placed in discover. However, in some situations, analysis helps understanding, when placed in other chapters. We have tried not be completely slaves of the method, and have arranged it in the way we find best. With the benefit of hindsight, the question is, whether or not we hinder ourselves from communicating in a better way. We have chosen not to dive into other communication methods, considering the amount of other fields to explore. This method, like Charles' outline, demands management and scheduling. The management has been done through democratic meetings, where scheduling was decided and tasks handed out. Most of the time, the deadlines were kept. The few times they were not, the schedule left room for it. In the end, we are quite satisfied with the work process, even though switching methods and keeping deadlines has kept us occupied. It has never turned into stress and bad mood in the group.

7.2 Conclusion

To answer the question "Can an IT system be realised to close the gap between found problems and the visions of AAU?", we will take a look upon the different parts of the report.

The analysis showed that much of the process involved distributing and administrating papers. In particular, this involved the International Office, department secretaries and the study board. The question was why it is so hard to administrate the process.

The analysis indicated three main problem areas, namely process management, digitalisation and standardisation, and that led to the paradoxes needed to be solved, before AAU can accommodate their visions.

The visions indicated, that in the future, 1 out of 10 students at AAU will be international students, and that AAU wants to extend their level of internationalisation. These tasks seem complicated, if their current problems cannot be solved. Also, equal rights are pointed out as a paradox, because of the different handling of each student. That is, some students are treated differently in matters of linguistic skills, depending on where they are from. Lastly, the visions stated that the administration should be carried out as closely as possible to managers and environments. This is paradoxical as large parts of the administration are carried out at the International Office, and not at individual departments.

The question was whether or not their visions were realistic from a theoretical point of view.

The three problems were looked upon individually, and different ideas were presented, based on different theorists. This led to 3 different scenarios, that involved creating a new standardised process, introducing an underlying system that will support the new process, and cutting away unnecessary parts of the administrative process.

Based on the presented theorists, a scenario was selected. The choice ended up being a scenario, where the International Office was kept, and the department secretaries and the study board were cut away, arguing that the International Office is the only instance in the process, that has a general overview. The International Office therefore has general ownership of the process, and thereby the final responsibility.

This however compromises the vision that administration jobs should be carried out as closely as possible to managers and environments, serviced by the administrative unit in question. If this vision is to be accomplished, a different solution should have been chosen, maybe one that excluded the International Office and kept the department secretaries.

The theory found suggested, that when a system is implemented, the focus should not only lie at the technical aspects. Also, a change of management must be considered. Therefore, it is important to think about the communication with employees, and to involve them in the development and the implementation phases.

In the last chapter we looked at different development methods. Here we chose to extend the existing solution, realising that making a new one would be expensive, considering the extend of usage.

This brings us back to our problem statement, " Can an IT system be realised to close the gap between found problems and the visions of AAU? ". The answer is simple, yes it can. Even though we chose a different solution in this project, arguing that a process owner, who can manage the end to end process, is needed, other scenarios were also proposed. A different scenario could have been to cut away the International Office, which would bring the administration close to the environments and accommodate the last vision. But the choice of solution is not the only factor in creating an IT-system. If the system is not economically justifiable, there would not be any point of creating a system to handle new processes. And even though you have to look at a lot of different elements, it will probably always boil down to an economic decision.

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APPENDIX A

IEEE 830-1998 REQUIREMENTS SPECIFICATION

A.1 Introduction

This requirements specification covers the admission process of international students at Aalborg university. Furthermore, it covers the wish to implement an IT-solution, that can handle it in order to accommodate their visions for the future. The specification follows the IEEE 830-1998 standard (IEEE, 1998). As this specification is an addendum of a project report, the report should be seen as an appendix of the specification. For the same reason, the specification will be kept short, as descriptions of the context of the system, are evident from the report.

A.1.1 Purpose

The purpose of this document is to describe a system, that can solve the current problems stated by the report, in order to:

- (a) Accurately describe what we wish to obtain.
- (b) Make the suppliers understand exactly what we want.

A.1.2 Scope

The scope of the specification is to only look at the admission process. The SRS will not address how the results were obtained, that is relevant theory and so on. This can be found in the report.

A.1.3 Definitions, acronyms and abbreviations

Here, a list of definitions, acronyms and abbreviations is stated, in order to help the reader understand the requirements specification. Furthermore, they are listed alphabetically.

- SRS = software requirements specification
- Virtual machine = software implementation of a computer, that executes programs like a physical machine.
- VMware = <http://www.vmware.com>
- W3C = World Wide Web Consortium, <http://www.w3.org/>

A.1.4 Overview

The rest of the SRS will describe the system. That is, an overall description, specific requirements, and appendixes.

A.2 Overall Description

This section describes the general factors that affect the product and its requirements. This section does not state specific requirements. Instead, it provides a background for the requirements, which are described in detail in section see section A.3.

A.2.1 Product Perspective

This subsection of the SRS puts the system to be developed into perspective of other related products, in this case the existing system.

The existing underlying system consists of a database management system with 2 databases, that are important for the application process, with different web interfaces attached to it. The two databases consists of:

- (a) A database that handles web applications from the student.
- (b) A database, in which the International Office can load the web application, when a hardcopy is received. This database consists of data regarding the application process.

The technology, that they are based on, is XHTML as mark-up language for the web interfaces, ASP.NET as scripting language (which handles interaction with the database) and the database itself, which is the relational database system MSSQL.

The new solution does not have to depend on these old technologies, but should be able to embed the same functions, and import the data from the existing databases.

Communication interfaces

There are no explicit requirements regarding protocols, other than the fact that the userinterface should be browser based, and that the system needs to be able to enroll students to the STADS system.

A.2.2 Product Functions

The major functions of the system to be developed are described in the design chapter of the report, see chapter 5. The description includes a workflow diagram of the process-to-be. This includes the different users of the system, and where and how they need to interact with it. The overall functions are:

- Archivation of applications
- Sending notifications
- Updating applications in the archive
- Import data from the old databases
- Use of existing web interface for applications
- Support the user tasks involved through web interfaces
- Enroll students to the STADS system

A.2.3 User Characteristics

This subsection describes general characteristics of the intended users of the product. We will not go into detail with requirements, but rather provide reasons for the later specified requirements.

Students

International students are basically any student that comes from outside of Denmark. There are different kinds of students. The technical knowledge of the students is various, it depends on the field of study. It is assumed, that the students know how to use a standard web interface.

Secretaries International office

The International Office is an administrative organ at AAU, that specifically handles international students. The purpose of the International Office is to handle the numerous tasks related to implementation of the service provided in connection with international cooperation at Aalborg University. The Secretaries have low to medium technical knowledge, but have experience using the current system.

Coordinators

The coordinators are the ones that evaluate the student paperwork. Each coordinator is relevant for a given education. Usually, there is one coordinator per education. The coordinators have various levels of technical knowledge, depending on what department of the university they come from.

A.2.4 Constraints

This subsection will provide a general description of any other item, that will limit the developer.

- (a) Hardware limitations
The system needs to run on the existing servers, serving the International Office.
- (b) Interfaces to other applications
The system needs to use webinterfaces.
- (c) Audit functions
When appropriate, the system must update the student applications in the database, according to the process description, see chapter 5.
- (d) Control functions
The system must be able to make decisions based on inputs, as described in the process description, see chapter 5.
- (e) Reliability requirements
The uptime of the system must be no less than the required uptime of the present system, including the website.
- (f) Criticality of the application
As the database contains information crucial to admittance of international students, there needs to be redundant backups, in order to ensure data integrity and uptime.
- (g) Safety and security considerations
As the data stored in the database is private, the system must comply with the Danish Act on Processing of Personal Data (Justitsministeriet, 2000).

A.2.5 Assumptions and Dependencies

The system requirements are based on the assumption that STADS will continue to be the central database of active students at the university.

A.3 Specific Requirements

This section of the SRS will contain all of the software requirements, to a level of detail that is sufficient to enable designers to design a system, that will satisfy those requirements.

A.3.1 External Interfaces

Here, all inputs into and outputs from the system are listed, as described in the process description, see chapter 2.

Inputs

Here, all inputs are listed.

Name	Input from online application form.
Description	The system receives data from a web based application form, that the international student fills out on the university homepage. This data must be stored in the database.
Source	The international student via the university homepage.
Valid range	Data, specified in the existing webform.
Data format	Text.

Name	Secretary validation of hardcopy.
Description	The secretaries of the International Office must validate whether the hardcopy is genuine and relevant fees have been paid, and update the status of the application in the database.
Source	Webinterface for secretaries.
Valid range	Boolean - either yes or no.
Data format	Boolean.

Name	Add hardcopy scan to application in database.
Description	The secretaries need to add the documentation contained in the hardcopy to the application in the database.
Source	Webinterface for secretaries.
Valid range	Multiple PDF files.
Data format	PDF

Name	Coordinator validation of application.
Description	The coordinator at the relevant institute must validate the application.
Source	Webinterface for coordinators.
Valid range	Two booleans and comment with reason, if rejected. One boolean for validation, and one for insufficient data in the application.
Data format	Booleans and text.

Name	Acceptance and arrival form.
Description	The international student must fill out a webbased form, stating whether he/she accepts the study, a picture of the student, a statement of arrival time and accommodation details. See existing acceptance and arrival form.
Source	Webinterface for international students.
Valid range	Boolean for acceptance of study, PNG image of student, text for arrival and accommodation details.
Data format	Boolean, PNG file, text.

Name	Archive a student.
Description	Manually change the status of the application in the database to either "Student active" or "Student not active".
Source	Webinterface for secretaries.
Valid range	Boolean - active or not active.
Data format	Boolean.

Outputs

Here, all outputs are listed.

Name	Notification of application ready for coordinator validation.
Description	The system must send out an autogenerated email to the right coordinator, when an application is ready to be validated.
Destination	Coordinators email.
Valid range	Email.
Data format	Text.

Name	Notification of application validation to International Office.
Description	The system must send out an autogenerated email with validation result to the International Office secretaries, when an application has been validated.
Destination	International Office secretary email.
Valid range	Email.
Data format	Text.

Name	Notification of application validation to international student.
Description	The system must send out an autogenerated email with validation result to the international student, when an application has been validated. If the application has been approved, the email requests that the student fills out the acceptance and arrival form. If rejected, the email states the reason of rejection.
Destination	International students email.
Valid range	Email.
Data format	Text.
Name	Acceptance reminder notification.
Description	The system must send out an autogenerated email, when the international student has not filled out the acceptance and arrival form.
Destination	International students email.
Valid range	Email.
Data format	Text.
Name	Notification of acceptance form status to International Office.
Description	The system must send out an autogenerated email, containing the status of the acceptance and arrival form, that the student is supposed to fill out. This can be filled out with positive or negative answer, or the student has failed to fill it out.
Destination	International Office secretarys email.
Valid range	Email.
Data format	Text.

User Interfaces

Here, a list of desired features of the user interfaces, needed to fulfill the requirements, is shown. There should be three different types of web interface users - Students, secretaries at the International Office and coordinators.

The students need two different forms to apply data to the system. One for the initial application, and one for acceptance and arrival. The application form should follow the existing form, as seen on <http://cpd.aau.dk/ikweb/application/application.aspx>, and hence, it must include functionality to submit the following information:

- Date of birth
- Gender
- Passport Citizenship
- Name
- Address
- Country
- Phone/Fax/Email
- Name and phone of next of kin
- Relevant academic records
- Study wishes
- English proficiency
- Study finance method
- Study period (if applying by the Socrates programme)

When filling out the acceptance and arrival form, the student must submit the following information:

- Acceptance or rejection of study
- Arrival time
- Picture for study card

The secretaries need to be able to apply hardcopy data to the applications. Furthermore, they should be able to see the status of the application in the process at all times. When an application fee has not been paid, they should be able to send a reminder to the student in question. If needed, they should also be able to manually changing the status of the student to active or not active. Therefore, the interface should support submitting the following data:

- Load application from system
- Add hardcopy data (PDFs) to application
- Change application status to active or not active
- Send fee reminders
- See process status of an application

The coordinators must be able to load all data, regarding an application, from the system, when notified about a pending application. He must then decide whether a student is qualified to be admitted. If enclosed data is insufficient, the application should be rejected, with an “insufficient data” option. This results in a need for the following functionality:

- Load application from system
- Load enclosed data
- Validate application by accepting or declining it
- If declined, state if the reason is insufficient data
- State reasons for the validation

Software Interfaces

The overall system must be used through web interfaces, and as such, the underlying database system must be accessible by browsers.

A.3.2 Functional Requirements

In this section, the actions, that should take place internally in the system, are listed.

Actions	
Name	Description
Add application to system	The system should validate that the webform has been filled out with correct datatypes. If this is the case, it should then check if the student already have an entry in the database. If so,it should be updated with the given data. Otherwise, the system should create a new entry with the data.
Archive student as not active	If input states that the application is rejected or the student declines study offer, the system should change the status of the student database entry to "Not active".
Archive student as active	If input states that the student has send acceptance and arrival form, in which he/she accepts the study offer, or the International Office manually states it, the system should change the status of the student database entry to "Active".
Send validation notification to coordinator	When a database entry is updated with a hardcopy scan, or a rejection of first choice, but the application contains a second choice, the system should send a notification email to the coordinator in charge of the study in question, to let him/her know that an application validation is pending.
Send approval notification to International Office	When a database entry is updated with an application approval, the system should send a notification email to the International Office, to let them know that they should send out a manual acceptance letter.
Send rejection notification to International Office	When a database entry is updated with an application rejection, the system should send a notification email to the International Office, to let them know that they should send out a manual rejection letter.
Send approval notification to international student and request acceptance and arrival form	When a database entry is updated with an application approval, the system should send a notification email to the international student, to let him/her know that he/she is accepted and should fill out an approval and arrival form.
Send rejection notification to international student	When a database entry is updated with an application rejection, the system should send a notification email to the international student, to let him/her know that he/she has been rejected and stating the reason for this.

Enroll student in STADS	If input states that the student has send acceptance and arrival form, in which he/she accepts the study offer, or the International Office manually states it, the system should enroll the student into the STADS system.
Send acceptance and arrival form reminder to international student	If the approval notification to the international student has been send, and the student has not filled out an acceptance and arrival form, the system should send out a reminder email.
Send acceptance and arrival form status notification to International Office	If an acceptance and arrival form is submitted, or two weeks have passed since an acceptance and arrival form reminder has been send, the system should send a notification email to the International Office.

A.3.3 Performance Requirements

Given the present amount of international students at the university, the database should be able to store all students applying or being admitted during a 10 year period. Given the present amount of international students, this corresponds to approximately 14000 database entries, according to numbers from 2008, as seen in appendix F.

Each database entry should be able to handle at least 30MB of PDF files and data stated through the webinterfaces, resulting in 420GB data for ten years of applications.

The system should support at least 30 simultaneous administrative users of webinterfaces. This includes secretaries at the International Office and coordinators at the institutes. Additionally, the system should support at least 100 simultaneous users of the online application webinterface.

For administrative users, it should be possible to load a database entry in less than a second through the webinterface, not including downloading PDF files.

A.3.4 Design Constraints

The web interfaces should be designed according to the W3C standards, in order to ensure browser compatibility. Furthermore, it should follow the AAU design guidelines stated at <http://design.aau.dk/hjemmesider>. If a system task takes more than 1 second to complete, there should be visual feedback.

A.3.5 Reliability

The system should have an uptime of at least 99%. Also, data integrity must be maintained. Thus, a redundant backup system is required.

A.3.6 Security

The system should handle data according to the Danish Act on Processing of Personal Data(Justitsministeriet, 2000). The webinterfaces should make use of data validation, in order to secure the database against injections, and undesired operations. Access logs should be stored in order to track unwanted queries to the database. When transferring data, the system should make use of encryption, in order to prevent unauthorized access.

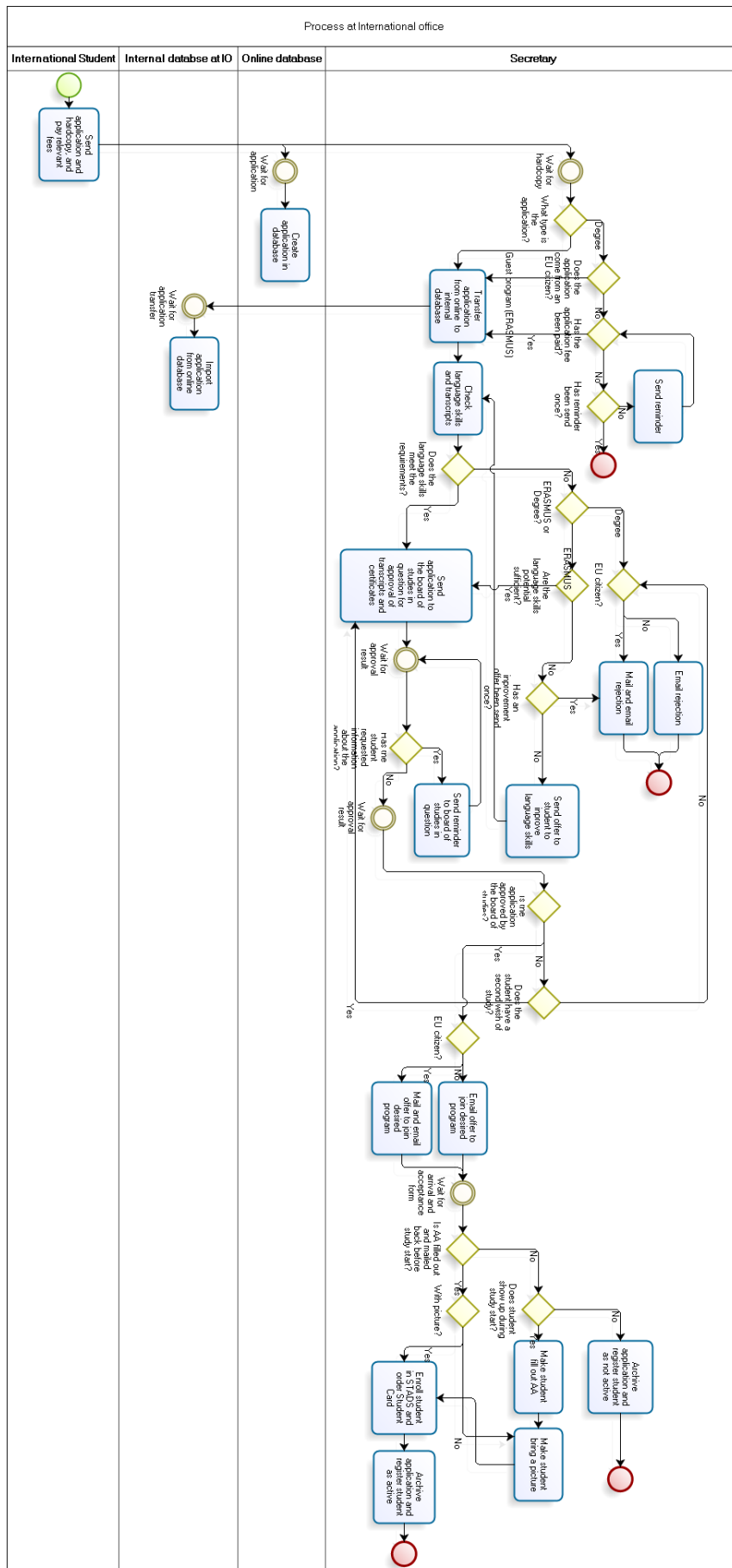
A.3.7 Portability

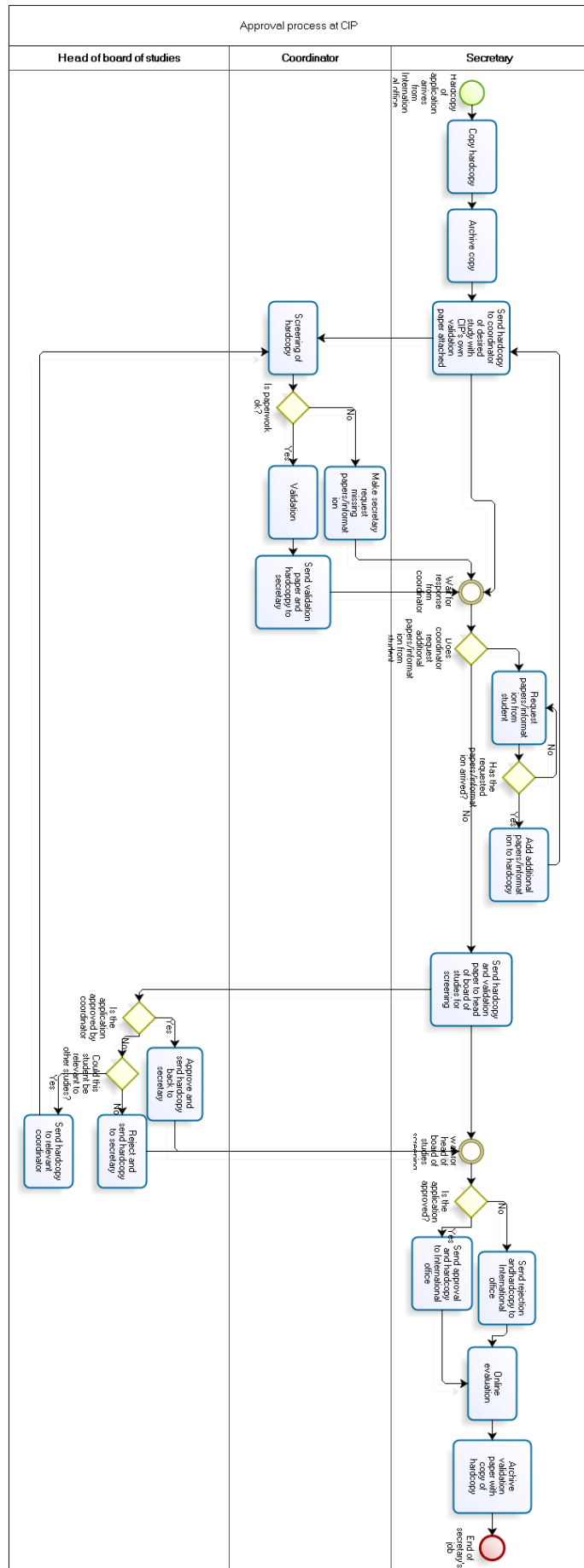
The system should be able to run from a VMware based virtual machine, as the present servers are using this. This will also make it easy to port to another physical server. The database should make use of an existing standard DBMS, in order to ensure the possibility of moving the database data to other databases.

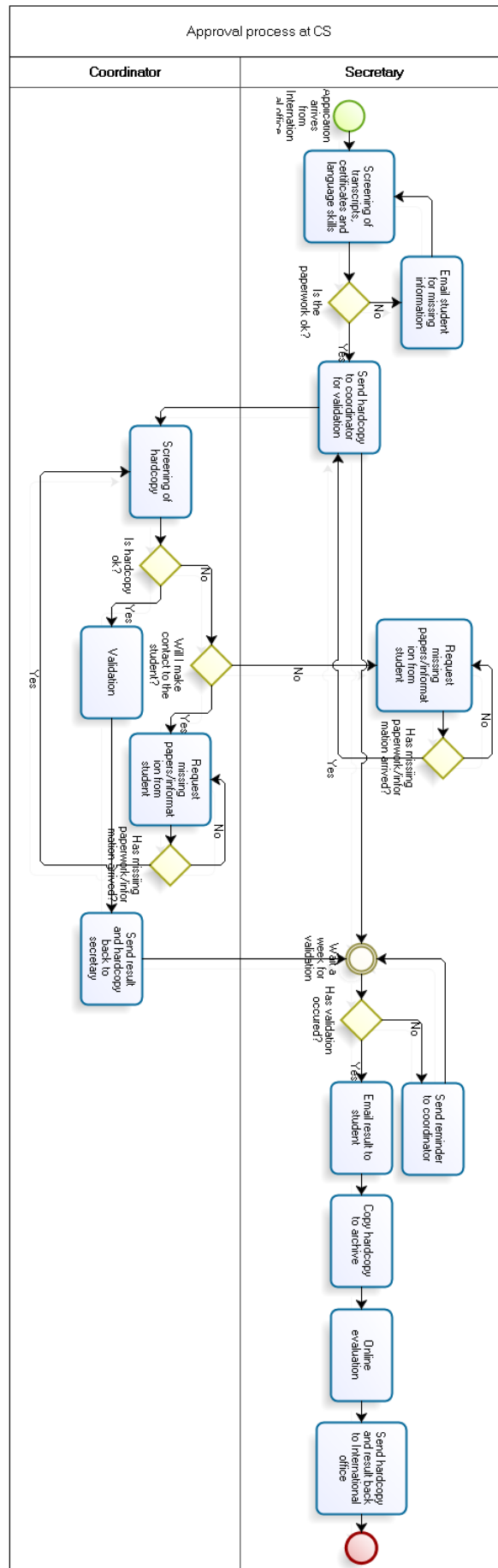
APPENDIX B

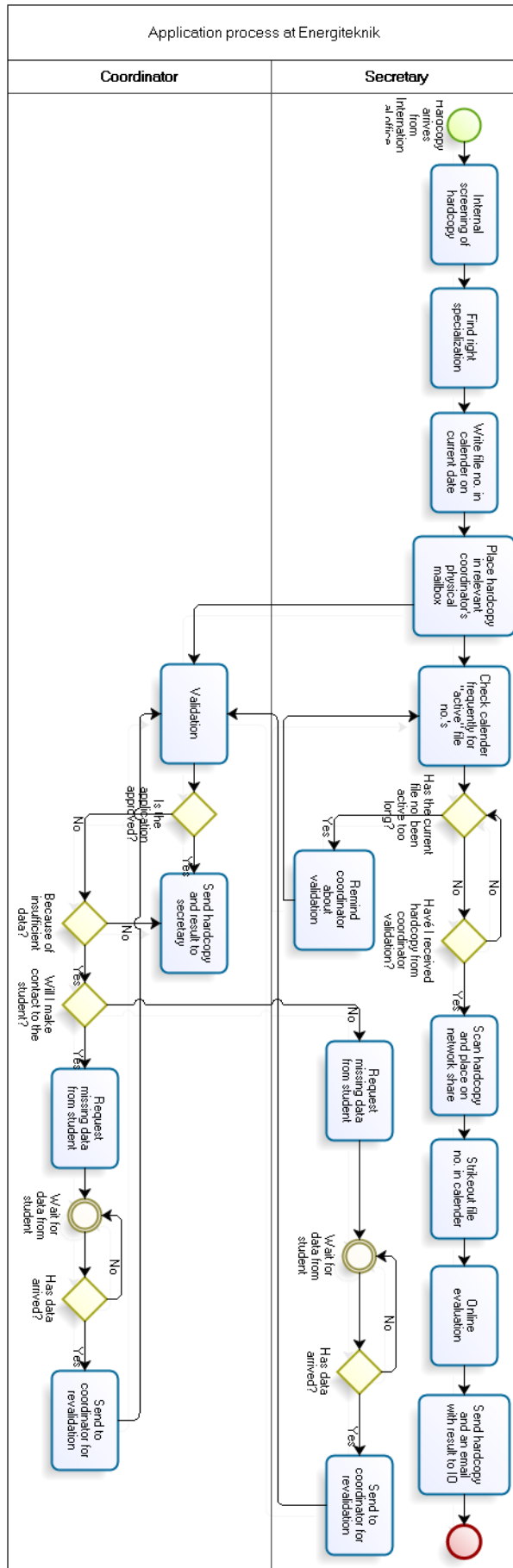
COMPLETE WORKFLOW DIAGRAMS

In this part of the appendix, the complete workflow diagrams, showing the AS-IS situation, are presented.









APPENDIX C

NOTES FROM THE INTERVIEW WITH THE SECRETARY AT DEPARTMENT OF ENERGY TECHNOLOGY

Hard copy -> 6 coordinators

6 specialisations

Almost definite that each coordinator get their own field to validate.

Secretary scans the hardcopy - saves on network share

Mails degree

Mails guest

Online evaluation

English qualifications not always ok, when receiving from International Office.

Professors sometimes approve their english anyways.

International Office sends the admission letter.

Intro semestre must be passed - counts as a stop test

Guest at 5. - 6. semestre

Personal follow ups are necessary to ensure validation process - regular calendar as a control

Everyone contacts the international students. Secretary and coordinators.

PhDs also through International Office

Missing info is requested from international students both by coordinators and the sec-

retary.

What semestre students should take is not definite - needs to be estimated.

Papers sometimes arrive after the students.

APPENDIX D

EMAILS REGARDING CURRENT SYSTEM

On the following pages, our correspondences with secretaries and the man, who have developed the International Office's current IT-systems, are presented. We have gathered the data about the systems, by informal questions, send by email.



Kristian Hove Andersen <khovea@gmail.com>

Identifikatiom af IT understøttelse i jeres arbejdsgange

12 messages

Kristian Hove Andersen <kander08@student.aau.dk>**3 November 2010 09:20**

To: bsm@adm.aau.dk, sdt@adm.aau.dk, ace@adm.aau.dk

Cc: b502a@cs.aau.dk

Hej Internationalt kontor

Vi er på baggrund af det I hidtil har hjulpet os med - og mange tak for det - nået lidt videre i vores projekt.

Lige nu er det vigtigt for os at få identificeret den IT understøttelse, der er i jeres arbejdsgange. Hidtil er vi stødt på to databaser, når vi har snakket med jer. Henholdsvis en online database og en database I tilgår på anden vis. Dem vil vi gerne vide lidt mere om. Vi vil også gerne vide om der er flere IT systemer i brug i optagelsesprocessen.

Er det lettest for jer, hvis vi kommer forbi til en lille snak og i så fald hvornår, eller vil I gerne have spørgsmålene på mail?

På forhånd tak.

Gruppe B502a
BAIT

Birgitta Schiørring Madsen <BSM@adm.aau.dk>**3 November 2010 09:24**

To: "khovea+mailaau.dk@gmail.com" <khovea+mailaau.dk@gmail.com>

Hej Kristian,

Jeg er temmelig hængt op i denne og næste uge, så en mail vil være fint for mig.

Kind regards / Mange hilsner,

Birgitta Schiørring Madsen, MSc
International CoordinatorInternational Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark

-----Oprindelig meddelelse-----

Fra: Kristian Hove Andersen [mailto:kander08@student.aau.dk]

Sendt: 3. november 2010 09:21

Til: Birgitta Schiørring Madsen; Sara D. Thomsen; Ann Christina Wibæk Evers

Cc: b502a@cs.aau.dk

Emne: Identifikatiom af IT understøttelse i jeres arbejdsgange

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>**3 November 2010 09:46**

To: Birgitta Schiørring Madsen <BSM@adm.aau.dk>, ace@adm.aau.dk, sdt@adm.aau.dk

Hej Birgitta,

Det er bare i orden. Her er spørgsmålene:

- **Online database:**
 - *Hvad er denne databases formål?*
 - *Hvordan bruges data fra denne database i det daglige arbejde?*
 - *Det er den samme database som sekretærene på institutterne laver "online evalutaion" i?*
 - *Hvem har umiddelbart adgang til denne database?*
- **Anden data:**
 - *Hvad er denne databases formål?*
 - *Hvordan bruges data fra denne database i det daglige arbejde?*
 - *Hvem har umiddelbart adgang til denne database?*
- **Andre systemer:**
 - *Bruger I andre IT systemer i optagelsesprocessen?*
 - *Hvis ja, hvilke?*
- **Administration af jeres IT systemer:**
 - *Hvem er ansvarlige for jeres IT systemer?*
 - *Hvor henvender I jer for at få support, hvis der opstår fejl?*

Spørgsmålene behøver bestemt ikke besvares på denne måde, hvis det giver bedre mening at forklare det på en anden.

Vi vedhæfter lige mailen til de andre vi har været i kontakt med også.

På forhånd tak.

Gruppe B502a
BAIT

2010/11/3 Birgitta Schiørring Madsen <BSM@adm.aau.dk>

[Quoted text hidden]

Birgitta Schiørring Madsen <BSM@adm.aau.dk>**4 November 2010 12:08**

To: "khovea+mailaauk@gmail.com" <khovea+mailaauk@gmail.com>

Hej Kristian,

Ann Christina og jeg har delt spørgsmålene mellem os – jeg tager nr. 1 og 3, ACE tager 2 og 4 – blot til info.

Vedr. Online database:

Online databasen er stedet, hvor de internationale studerende sender deres ansøgning til elektronisk og det er her de ligger "på lager" indtil vi modtager deres fysiske ansøgning og dok via post. Vi gør ikke noget ved en ansøgning der ligger i online basen før vi får noget fysisk tilsendt.

Der findes både en online database for guests/ERASMUS/exchange, for degree og for Phd'ere (den sidste bruges ikke pt)

Når vi modtager den fysiske ansøgning, går vi ind i online databasen, finder den studerende og vipper ansøgningen over i selve databasen. Hermed er vores brug af online databasen sådan set overstået for denne specifikke ansøger.

Nej, sekretærerne har adgang til og evaluerer via vores database og IKKE online databasen.

Online databasen har alle i indgående team adgang til, faktisk vil jeg tro at alle på IK kan komme ind i denne online database, hvis de skulle se efter om en ansøgning var lagret der etc. Desuden har vores IT-supporter naturligvis adgang.

Vedr. Andre systemer:

De studerende skal jo på et tidspunkt overføres fra vores database til STADS, men denne del er jeg ikke involveret i.

Kind regards / Mange hilsner,

Birgitta Schiørring Madsen, MSc
International Coordinator

International Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark

Fra: Kristian Hove Andersen [mailto:kander08@student.aau.dk]

Sendt: 3. november 2010 09:47

Til: Birgitta Schiørring Madsen; Ann Christina Wibæk Evers; Sara D. Thomsen

Emne: Re: Identifikatiom af IT understøttelse i jeres arbejdsgange

[Quoted text hidden]

Ann Christina Wibæk Evers <ace@adm.aau.dk>

4 November 2010 14:20

To: "khovea+mailaaudk@gmail.com" <khovea+mailaaudk@gmail.com>

Hej Kristian

Her kommer svar på spr. 2 og 4.

- **Anden data:**

- *Hvad er denne databases formål? Hvordan bruges data fra denne database i det daglige arbejde?*

Vores "rigtige" database er den vi "vipper" ansøgningerne over i når vi har modtaget en hard copy. Denne DB bruger vi fremover til at registrere al information på sage, sende Emails/printe breve til den studerende (optagt /afslag/betinget optag). Kort sagt er det her vi har al digital info om vores studerende – både mens de er til faglig evaluering og efter en afgørelse er truffet ift optag/afslag.

- *Hvem har umiddelbart adgang til denne database? Alle på lk men det er kun "optag" teamet der reelt bruger den.*

- **Administration af jeres IT systemer:**

- *Hvem er ansvarlige for jeres IT systemer? Hvor henvender I jer for at få support, hvis der opstår fejl?*

Vores databaser er lavet en en lokal IT-mand Jimmi Jensen der pt er ansat på inst. 20. Fordi han har flyttet afdeling er det noget med at han reelt set ikke længere får løn for at hjælpe os men han er stadig sød til at hjælpe når der er problemer eller vi har noget der skal laves om i databasen. Det er altså ham vi kontakter når vi har problemer. Det problematiske ville opstå Jimmi pludselig skulle få arbejde underfor AAU – så er vi lidt på den!

Kind regards,

Ann Christina Evers, MA
International Coordinator
International Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark
Phone: +45 9940 9652
Fax: +45 9815 4522
Email: ace@adm.aau.dk
Website: www.studyguide.aau.dk

Fra: Birgitta Schiørring Madsen
Sendt: 4. november 2010 12:09
Til: Kristian Hove Andersen
Cc: Ann Christina Wibæk Evers
Emne: SV: Identifikatiom af IT understøttelse i jeres arbejdsgange

Hej Kristian,

Ann Christina og jeg har delt spørgsmålene mellem os – jeg tager nr. 1 og 3, ACE tager 2 og 4 – blot til info.

Vedr. Online database:

Online databasen er stedet, hvor de internationale studerende sender deres ansøgning til elektronisk og det er her de ligger "på lager" indtil vi modtager deres fysiske ansøgning og dok via post. Vi gør ikke noget ved en ansøgning der ligger i online basen før vi får noget fysisk tilsendt.

Der findes både en online database for guests/ERASMUS/exchange, for degree og for Phd'ere (den sidste bruges ikke pt)

Når vi modtager den fysiske ansøgning, går vi ind i online databasen, finder den studerende og vipper ansøgningen over i selve databasen. Hermed er vores brug af online databasen sådan set overstået for denne specifikke ansøger.

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Online databasen har alle i indgående team adgang til, faktisk vil jeg tro at alle på IK kan komme ind i denne online database, hvis de skulle se efter om en ansøgning var lagret der etc. Desuden har vores IT-supporter naturligvis adgang.

Vedr. Andre systemer:

De studerende skal jo på et tidspunkt overføres fra vores database til STADS, men denne del er jeg ikke involveret i.

Kind regards / Mange hilsner,

Birgitta Schjørring Madsen, MSc
International Coordinator

International Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark

Fra: Kristian Hove Andersen [mailto:kander08@student.aau.dk]
Sendt: 3. november 2010 09:47
Til: Birgitta Schiørring Madsen; Ann Christina Wibæk Evers; Sara D. Thomsen
Emne: Re: Identifikatiom af IT understøttelse i jeres arbejdsgange

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>
To: Ann Christina Wibæk Evers <ace@adm.aau.dk>, bsm@adm.aau.dk
Cc: b502a@cs.aau.dk

4 November 2010 14:25

Hej,

Mange tak for jeres hurtige svar. Det ser yderst brugbart ud :)

Kristian Hove Andersen
Gruppe B502a
BAIT

2010/11/4 Ann Christina Wibæk Evers <ace@adm.aau.dk>

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>
To: "khovea+mailaau.dk@gmail.com" <khovea+mailaau.dk@gmail.com>

4 November 2010 14:24

Hej,

Mange tak for jeres hurtige svar. Det ser yderst brugbart ud :)

Kristian Hove Andersen
Gruppe B502a
BAIT

2010/11/4 Ann Christina Wibæk Evers <ace@adm.aau.dk>

[Quoted text hidden]

Ann Christina Wibæk Evers <ace@adm.aau.dk>
To: "khovea+mailaau.dk@gmail.com" <khovea+mailaau.dk@gmail.com>

4 November 2010 15:11

Godt – ellers må I skrive igen.

Kind regards,

Ann Christina Evers, MA
International Coordinator
International Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark

Phone: +45 9940 9652
Fax: +45 9815 4522
Email: ace@adm.aau.dk
Website: www.studyguide.aau.dk

Fra: Kristian Hove Andersen [mailto:kander08@student.aau.dk]

Sendt: 4. november 2010 14:25

Til: Ann Christina Wibæk Evers; Birgitta Schiørring Madsen

Cc: b502a@cs.aau.dk

[Quoted text hidden]

[Quoted text hidden]

Kristian Hove Andersen <khovea@gmail.com>

8 November 2010 10:09

To: Ann Christina Wibæk Evers <ace@adm.aau.dk>, bsm@adm.aau.dk

Cc: b502a@cs.aau.dk

Hej igen,

I bruger begge to begrebet "vippe ansøgning over". Må jeg spørge, hvad det dækker over? Er det noget I gør med et par klik i de respektive systemer, eller er det manuelt tastearbejde?

På forhånd tak.

[Quoted text hidden]

Kristian Hove Andersen <khovea@gmail.com>

8 November 2010 10:08

To: "khovea+mailaaudk@gmail.com" <khovea+mailaaudk@gmail.com>

Hej igen,

I bruger begge to begrebet "vippe ansøgning over". Må jeg spørge, hvad det dækker over? Er det noget I gør med et par klik i de respektive systemer, eller er det manuelt tastearbejde?

På forhånd tak.

[Quoted text hidden]

Birgitta Schiørring Madsen <BSM@adm.aau.dk>

8 November 2010 12:47

To: Kristian Hove Andersen <khovea@gmail.com>, Ann Christina Wibæk Evers <ace@adm.aau.dk>

Cc: b502a@cs.aau.dk

Hej

Det er en kombination. Vi går ind på online ansøgningen, tjekker at navn, adresse etc. Er skrevet ok (store/små bogstaver, landet skrevet mere end en gang etc), indskriver den rette periode, indskriver finansieringsform, indskriver evt. samarbejdsuniversitet. Derefter vippes ansøgningen over i databasen, hvorfra vi udskriver sagsmappe og sender email til stud. at ansøgningen er modtaget.

Mange hilsner

Birgitta

Fra: Kristian Hove Andersen [mailto:khovea@gmail.com]

Sendt: 8. november 2010 10:10

[Quoted text hidden]

[Quoted text hidden]

Birgitta Schiørring Madsen <BSM@adm.aau.dk>

8 November 2010 12:47

To: "khovea+mailaaudk@gmail.com" <khovea+mailaaudk@gmail.com>

Hej

Det er en kombination. Vi går ind på online ansøgningen, tjekker at navn, adresse etc. Er skrevet ok (store/små bogstaver, landet skrevet mere end en gang etc), indskriver den rette periode, indskriver finansieringsform, indskriver evt. samarbejdsuniversitet. Derefter vippes ansøgningen over i databasen, hvorfra vi udskriver sagsmappe og sender email til stud. at ansøgningen er modtaget.

Mange hilsner

Birgitta

Fra: Kristian Hove Andersen [mailto:khovea@gmail.com]

Sendt: 8. november 2010 10:10

[Quoted text hidden]

[Quoted text hidden]



Kristian Hove Andersen <khovea@gmail.com>

Teknologier benyttet til internationalt kontors systemer.

10 messages

Kristian Hove Andersen <kander08@student.aau.dk>**28 November 2010 15:40**

To: jsj@plan.aau.dk

Cc: b502a@cs.aau.dk

Hej Jimmy,

Vi skriver til dig, fordi vi kan forstå, at du er manden bag de af det internationale kontors systemer, der understøtter optagelsesprocessen.

Vi er en gruppe på informations teknologi 5. semester, der er i gang med et projekt vedrørende internationale studerende. Dette projekt har vi snævret ind omkring optagelsesprocessen, og i den forbindelse skal vi bl.a. kortlægge og beskrive nuværende procedurer og systemer. Vi har fat i, at der eksisterer 2 databaser. En de studerende poster en del af ansøgningen i online og en som det internationale kontor bruger til at opbevare alt omkring sagens gang i. Vi er dog på bag bund, når det drejer sig om hvilke teknologier, der er brugt til at skabe databaserne og de forskellige interfaces. Vi håber, at du vil bruge 5 minutter på at svare på følgende, selvom vi kan forstå, at arbejdet med disse systemer er på frivilligt basis:

- Hvilke database teknologier er der benyttet?
- Findes der andre interfaces end web interfaces?
 - Hvis ja, hvilken type og hvilken teknologi er brugt til disse?
- Hvilke script og opmærknings sprog bruges der?
- Findes der evt. noget dokumentation af systemerne?

Vi håber du vil hjælpe os.

På forhånd tak.

Gruppe B502a
BAIT5

Jimmi S. Jensen <jsj@plan.aau.dk>**28 November 2010 20:21**

To: "khovea+mailaauk@gmail.com" <khovea+mailaauk@gmail.com>

Hej

Jeg vil selvfølgelig gerne hjælpe jer. I hører fra mig igen i løbet af ugen.

--

mvh
Jimmi Jensen

Institut for Samfundsudvikling og Planlægning
Aalborg Universitet
Fibigerstræde 13, rum 61
9220 Aalborg Øst
Tlf: 9940 9865
Mobil: 2179 9193
Email: jsj@plan.aau.dk
<http://www.plan.aau.dk>

On 28/11/10 15.40, "Kristian Hove Andersen" <kander08@student.aau.dk> wrote:

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>

30 November 2010 09:21

To: "Jimmi S. Jensen" <jsj@plan.aau.dk>

Cc: b502a@cs.aau.dk

Det lyder rigtig godt. Tak for det.

Gruppe B502a
BAIT5

2010/11/28 Jimmi S. Jensen <jsj@plan.aau.dk>

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>

30 November 2010 09:19

To: "khovea+mailaaudk@gmail.com" <khovea+mailaaudk@gmail.com>

Det lyder rigtig godt. Tak for det.

Gruppe B502a
BAIT5

2010/11/28 Jimmi S. Jensen <jsj@plan.aau.dk>

Hej

[Quoted text hidden]

Jimmi S. Jensen <jsj@plan.aau.dk>

2 December 2010 14:07

To: "khovea+mailaaudk@gmail.com" <khovea+mailaaudk@gmail.com>

Hej

Der er kun en database som man godt kan sige er opdelt i 3: Modtagelse af online ansøgninger, sagsbehandlingen og Buddies.

- Kører på en Windows server, MS-SQL server og IIS-server.
- Databasen består af tabler, Views og stored procedure.
- Der er kun web-interfaces til databasen, hvor der bruges ASP.net og VB.net

Egentlig dokumentation har der ikke været tid(penge) til. Og arbejdet på systemet er ikke på frivilligt basis da der er en kontrakt mellem mit Institut og International kontor. Så jeg får lidt for at vedligeholde og tilrette databasen,webinterfacet :)

Vi startede med databasen i 2004 med en MS-Access 2003 der havde adgang (ODBC) til MS-SQL serveren.

Men som databasen voksede blev den stadig langsommere og krævede mere af hardwaren.


Og i 2008 flyttede jeg den kun til at være webbaseret.

Det var hvad jeg sådan lige hvad jeg kunne finde på at skrive nu :)

I er altid velkommen til at kontakte mig igen hvis I flere spørgsmål.

--

[Quoted text hidden]

 **internationaleKontor.pptx**
54K

Kristian Hove Andersen <kander08@student.aau.dk>

2 December 2010 14:13

To: "Jimmi S. Jensen" <jsj@plan.aau.dk>

Cc: b502a@cs.aau.dk

Hej igen,

Mange tak for det :-). Det var lige præcis de informationer vi eftersøgte.

Gruppe B502a
BAIT5

2010/12/2 Jimmi S. Jensen <jsj@plan.aau.dk>

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>

2 December 2010 14:12

To: "khovea@mailaaudk@gmail.com" <khovea@mailaaudk@gmail.com>

Hej igen,

Mange tak for det :-). Det var lige præcis de informationer vi eftersøgte.

Gruppe B502a
BAIT5

2010/12/2 Jimmi S. Jensen <jsj@plan.aau.dk>

Hej

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>

7 December 2010 13:31

To: "Jimmi S. Jensen" <jsj@plan.aau.dk>

Cc: b502a@cs.aau.dk

Hej igen,

Må vi spørge om en enkelt ting mere? Den Windows server systemet hostes på står den på det internationale kontor eller hostes af en IT-afdeling et sted på universitetet eller noget helt tredje?

På forhånd tak.

Gruppe B502a

BAIT5

2010/12/2 Kristian Hove Andersen <kander08@student.aau.dk>

[Quoted text hidden]

Kristian Hove Andersen <kander08@student.aau.dk>

7 December 2010 13:30

To: "khovea+mailaau.dk@gmail.com" <khovea+mailaau.dk@gmail.com>

Hej igen,

Må vi spørge om en enkelt ting mere? Den Windows server systemet hostes på står den på det internationale kontor eller hostes af en IT-afdeling et sted på universitetet eller noget helt tredje?

På forhånd tak.

Gruppe B502a
BAIT5

2010/12/2 Kristian Hove Andersen <kander08@student.aau.dk>

Hej igen,

[Quoted text hidden]

[Quoted text hidden]

Jimmi S. Jensen <jsj@plan.aau.dk>

7 December 2010 13:34

To: "khovea+mailaau.dk@gmail.com" <khovea+mailaau.dk@gmail.com>

Hej

Det er en virtual server der hostes af HUM-AAU

--
mvh
Jimmi Jensen

Institut for Planlægning, Aalborg Universitet
Fibigerstræde 13, rum 61
9220 Aalborg Øst
Tlf: 9940 9865
Email: jsj@plan.aau.dk

REMEMBER:

You should never give your password to anyone, not even to an IT supporter, a colleague, a boss - your password is like a PIN code for your credit card - it should only be yours.

Aalborg University will never ask you for your password.

On 07/12/10 13.31, "Kristian Hove Andersen" <kander08@student.aau.dk> wrote:

[Quoted text hidden]

APPENDIX E

TRANSCRIPTIONS OF MAIN POINTS IN INTERVIEWS

In this appendix, we present the main points, that we referenced to in the problem section of the chapter “Discover”. These main points are transcriptions from recordings of different interviews. The recordings of the interviews can be found on <http://www.cs.aau.dk/~chpoul/interviews>, with the username “guest” and password “student42”. Department and position will appear along with the statements.

E.1 International office

Interview with secretary:

- *”The duration of the processes at the different departments varies a lot.”*

E.2 Department of Computer Science

Interview with secretary:

- *”I usually make a post-it with details of who has which hardcopies.”*
- *”I usually give the coordinators a week’s notice, before they receive a reminder.”*

Interview with coordinator:

- *”Some applicators feel that they should have the answer fast, if they have send the application early. However, the applications basically accumulates on my table, until I have an amount which is reasonable to handle, for example during an afternoon when the schedule allows it.”*
- *”By receiving the applications by for example email, it would be possible for me to get help from the history of the applications I have handled in the past.”*

E.3 Center of Industrial Production

Interview with secretary:

- *"I place a copy of our internal evaluation paper in a folder, when I send the hardcopy to a coordinator or the head of the study board. In this folder the copies are placed chronologically. I check the folder frequently, to identify whether the hardcopy have been in the possession of for example a coordinator for too long."*

Interview with coordinator:

- *"I only have contact with our secretary Sidse, and not the international students themselves. We have made this internal blanket, to have some kind of status on the process.
I actually think I would refuse to make contact, regarding for example missing papers, on my own."*
- *"Thinking in future improvements there must be some governance of the process so it becomes clear who owns it."*
- *"The current system does not provide any intelligence. Therefore, it cannot help us remember for example if a given bachelor degree has been approved before. Finding out whether a given bachelor degree can be approved, is a time consumer for every application."*

APPENDIX F

STATISTICS REGARDING INTERNATIONAL STUDENTS

Here, the mail involving statistics of admittance of international students is shown, along with a print of the numbers used.

Fwd: Antal ansøgere på et år Inbox | X

Kristian Hove Andersen to me [show details](#) Dec 9 (5 days ago) Reply

FYI

----- Forwarded message -----
From: Ann Christina Wibæk Evers <ace@adm.aau.dk>
Date: 2010/12/9
Subject: SV: Antal ansøgere på et år
To: *khovea+mailaau.dk@gmail.com* <khovea+mailaau.dk@gmail.com>

Hej,
 Jeg sender jer et link til vores statistik: <http://cpd.aau.dk/ikweb/statistik/> samt vejledning til log in. Så kan I selv finde alle de tal I har brug for mere detaljeret/Dbh.

Kind regards,

Ann Christina Evers, MA
 International Coordinator
 International Office
 Aalborg University
 Fredrik Bajers Vej 5
 DK-9220 Aalborg East
 Denmark
 Phone: +45 9940 9652
 Fax: +45 9815 4522
[Email: ace@adm.aau.dk](mailto:ace@adm.aau.dk)
[Website: www.studyguide.aau.dk](http://www.studyguide.aau.dk)

Fra: Kristian Hove Andersen (mailto:kander08@student.aau.dk)
Sendt: 8. december 2010 14:32
Til: Ann Christina Wibæk Evers; Birgitte Schjørring Madsen
Emne: Antal ansøgere på et år

Hej igen,

Vi vil lige starte med at sige tak for den store hjælp, I hidtil har bidraget med i forhold til vores projekt.
 Demæst vil vi lige bede om en lille ting mere. Kan I give et ca. tal på, hvor mange der i alt ansøger på et år f.eks. 2009?

På forhånd tak

Gruppe B502a
 BAIT5

Vejledning statistisk oversigt.doc
 45K [View](#) [Download](#)

AALBORG UNIVERSITY
 International Office

Alle Programmer

2012	2011	2010	2009	2008	2007	2006	2005	2004
01-02	01-09	01-02	01-09	01-02	01-09	01-02	01-09	01-02

Statistik

Modtaget studie	Evalueret	Betinget optag	Afslag	Optaget	Studieplads accepteret	Mødt på AAU
Start 01-09-2008						
Program						
Degree						
Guest						
Acoustics (ACN)		2	6	3		2
Windpower Systems (WPS)	1	4	2	6	1	3
Ialt	31	9	62	406	503	41
EU/EDS statsborgere (479)	3	0	13	32	168	16
Andre statsborgere (937)	28	9	49	374	335	25